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# Dental Digest

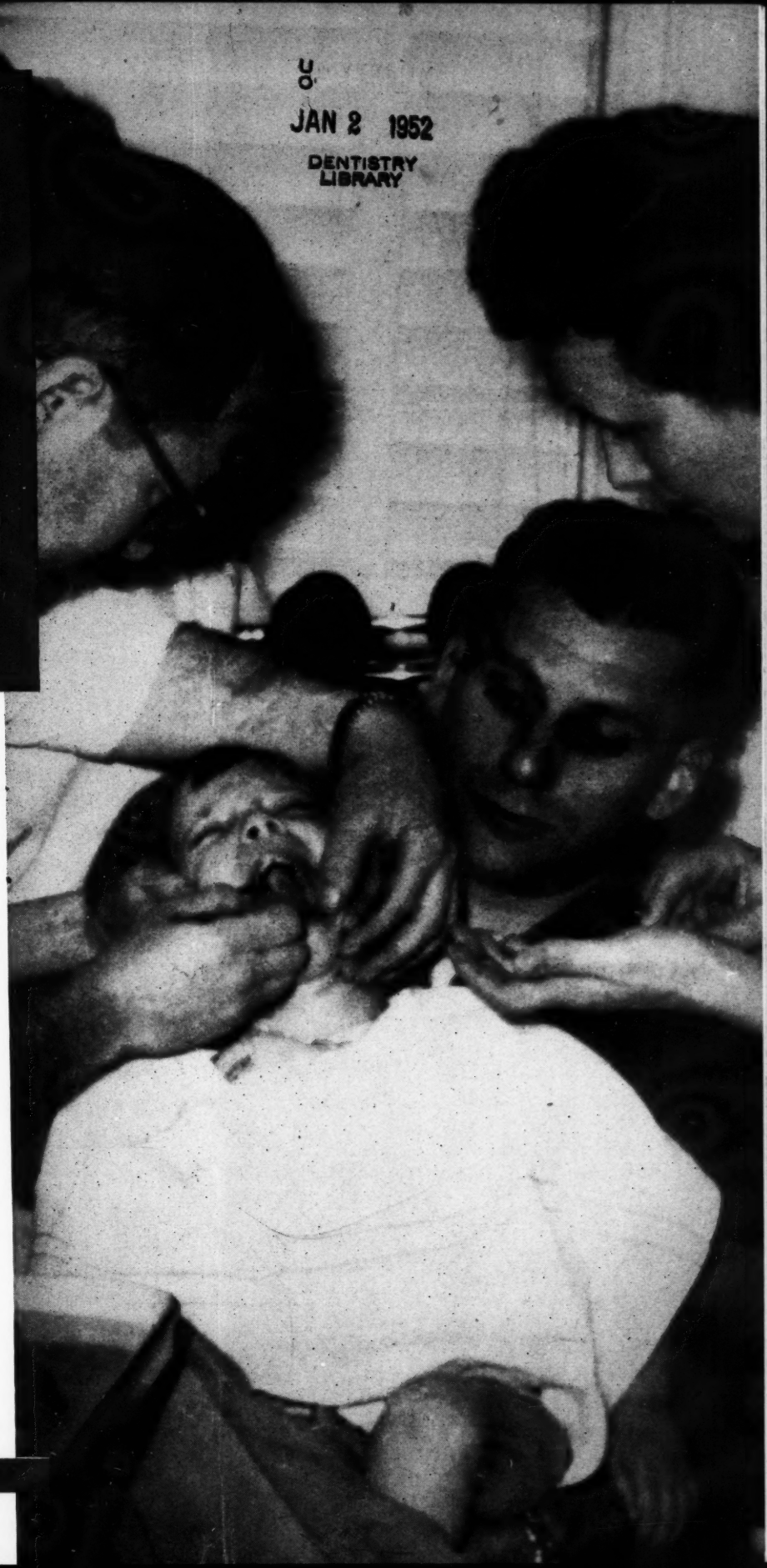
**December 1951**

## IN THIS ISSUE

Ortho-Prosthetic Approach to Mouth Rehabilitation ....	538
Dental Treatment of the Cerebral Palsied Child ....	544
Problem of "The Clicking Jaw" .....	549
Annual Index .....	554
Discussion of Cancer of the Mouth .....	555
Clinical and Laboratory Suggestions .....	558
The Editor's Page .....	560
Medicine and the Biologic Sciences .....	561
Contra-Angles .....	567

Complete Table of Contents appears  
on page 537

Cover Illustration—Moss Article,  
page 544



# FIVE-PHASE ANTERIORS...teeth can be transposed from different sets for "living" personalized dentures!



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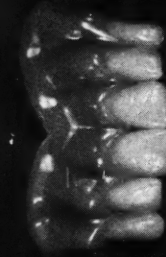
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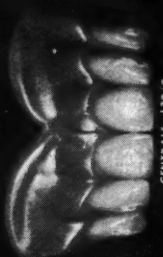
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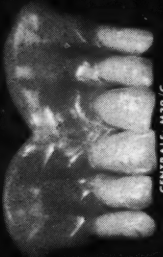
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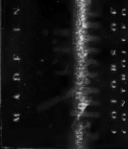


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## FIVE-PHASE ANTERIORS



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# Dental Digest

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**DECEMBER 1951**

Ortho-Prosthetic Approach to Mouth Rehabilitation <i>Jerome M. Coltune, D.D.S.</i> .....	538
Dental Treatment of the Cerebral Palsied Child <i>Aaron A. Moss, D.D.S.</i> .....	544
Problem of "The Clicking Jaw" <i>V. E. Ireland, M.B., B.S., L.D.S.</i> .....	549
Annual Index .....	554
A Discussion of Cancer of the Mouth—Part Two <i>Joseph E. Schaefer, D.D.S. M.D. and Ira Tresley, M.D.</i> .....	555
Clinical and Laboratory Suggestions .....	558
1. Water-Spray Technique. 2. A Child's Seat in the Regular Dental Chair. 3. Removing Oxide from Mercury. 4. An Instrument for the Separation of Teeth on Models. 5. An Adjustment of Angle Hand-piece Attachments. 6. Improving Darkroom Visibility.	
The Editor's Page .....	560
Contra-Angles .....	567
Medicine and the Biologic Sciences .....	561

## About Our CONTRIBUTORS

**JEROME M. COLTUNE, D.D.S.** (Temple University, School of Dentistry, 1933), specializes in mouth rehabilitation and has taught classes and lectured on this subject for thirteen years. Doctor Coltune publishes in **DENTAL DIGEST** for the first time this month, presenting **ORTHO-PROSTHODONTIC APPROACH TO MOUTH REHABILITATION**.

**AARON A. MOSS, D.D.S.** (New York University, College of Dentistry, 1933) is staff dentist at the Walter Matheny School for Cerebral Palsy and clinician in hypnodontics and psychosomatic dentistry. As well as numerous articles, a series of which will be published in book form this year, Doctor Moss is co-author of a symposium on hypnosis for medical purposes which will appear shortly. For his first publication in **DIGEST** Doctor Moss presents in the current issue **DENTAL TREATMENT OF THE CEREBRAL PALSIED CHILD**.

Doctor **JOSEPH E. SCHAEFER** and his collaborator, **IRA J. TRESLEY, B.S.** (University of Illinois, 1932), **M.D.** (University of Illinois, 1936) conclude their two-part discussion of cancer of the mouth in this issue, illustrating in particular the results of plastic surgery for repair of defects following extensive radiation therapy.

**EDWARD J. RYAN, B.S., D.D.S., Editor**

**WANDA T. PICKARD, B.A., Assistant Editor**

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# Ortho-Prosthodontic Approach to MOUTH REHABILITATION

JEROME M. COLTUNE, D.D.S., Philadelphia

## DIGEST

*This article challenges the belief that in persons past teen age orthodontic procedures are impractical. The repositioning of malposed teeth is quite often the only means of obtaining proper biomechanical functional forces for periodontal maintenance.*

*The general practitioner who lacks complete knowledge regarding orthodontic procedures should not attempt to treat this phase of a complicated case although some of the simpler cases can be successfully treated by any dentist. Many times orthodontics is only a step in occlusal reconstruction but makes the outcome of the completed case dramatic and well worth the effort involved.*

## Psychologic Considerations

Adult mouths requiring orthodontic intervention may be divided into two classes which quite often overlap: (A) esthetic, and (B) functional. The two classes will be considered together.

*Adult Persuasion Usually Unnecessary*—When an adult is convinced that an oral deformity can be corrected by orthodontic measures, persuasion of any kind is usually unnecessary. Human beings are usually amenable to suggestions regarding improvement of appearance. However, it is always wise to stimulate the wish for treatment and to have the demand come from the patient.

*Appliances Inconvenient*—In any

circumstances orthodontic appliances are an annoyance and the older the patient the less tolerant he is of foreign bodies in the oral cavity. Unless the patient's desire for treatment is firm he may discontinue treatment before completion. The dentist must then restimulate the wish for corrective treatment. This consideration is especially true in purely functional cases where anterior teeth are not involved.

*Benefits Described*—It is the author's policy to present the benefits to be derived from the proposed changes and then let the matter rest. The patient is usually surprised to learn that tooth movement can be accomplished at his age when he has probably been told many times that it is not feasible.

*Psychology Important in Treatment*—It is disheartening to have to discontinue a case before completion. Since movement of adult teeth is not accomplished as readily as that of children's teeth, the danger of the patient becoming impatient always exists, especially when the reason for treatment is better functional tooth alignment, with or without follow-up reconstruction. For this reason the psychology involved in treatment is as important as the appliance used.

## General Considerations

Some reconstruction is almost impossible without repositioning the teeth. Once a person is physiologically past the age of growth and development, all orthodontic movement is a compromise and should be planned as such. Any attempt at arch expansion or major tooth movement will

result in failure and collapse. This is a basic orthodontic concept.

A mouth that might be completely corrected by orthodontic means in a young person may require a combination of orthodontia and reconstruction in the adult.

*Extraction Often Indicated*—So that the result can be obtained with minimal tooth movement and as quickly as possible, extraction in adults is often indicated. Speed (with caution) is essential when dealing with adults and most of the present controversy over extraction in orthodontics is concerned with the growing child.

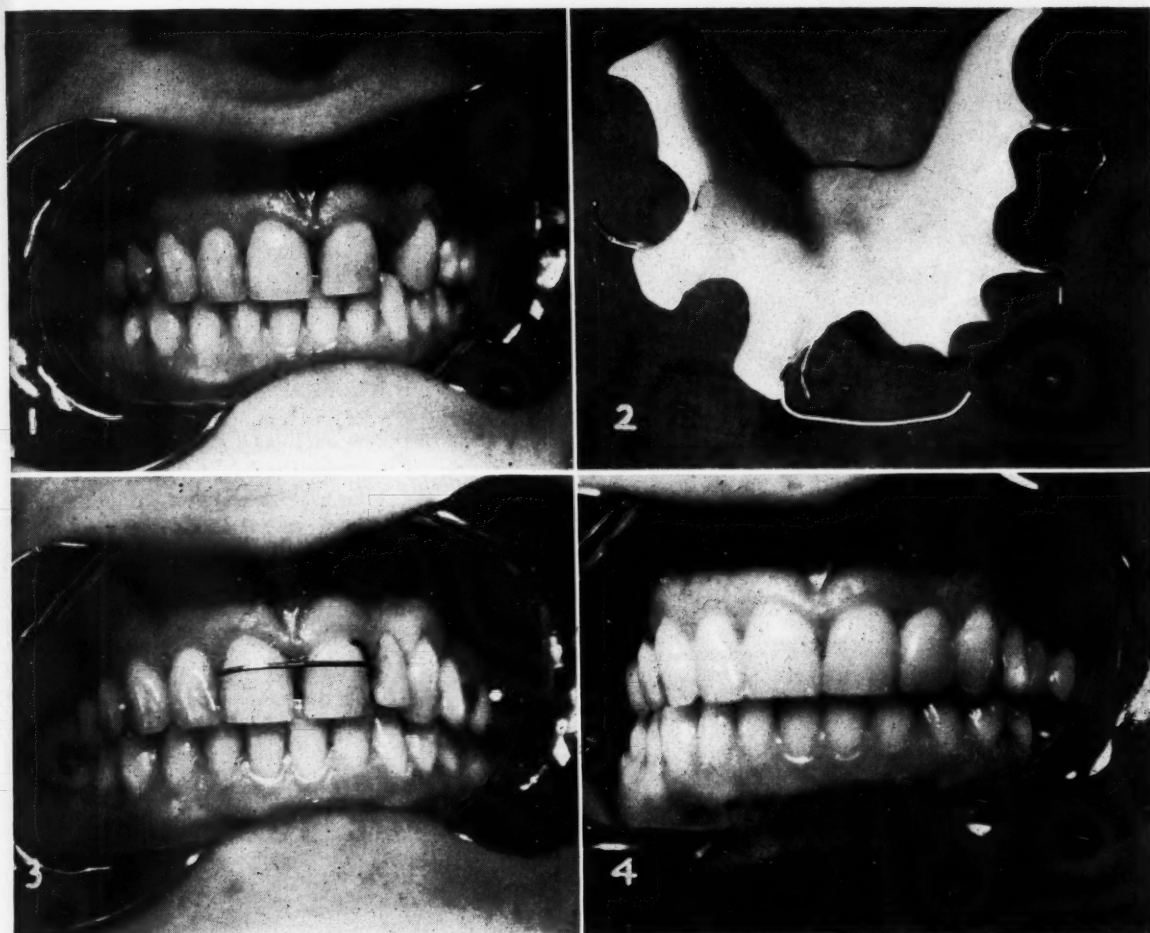
*Contraindications*—Thyroid and parathyroid cases should be discouraged unless the glandular condition is under control. (1) Neurotic persons, and (2) addicts of clamping and bruxism are poor risks because of the temptation to tamper with the appliance and the danger of periodontal collapse from poor oral habits.

*Bone Support Important*—Although the age factor is inversely proportional to the allowable amount of overall movement, the existing bone support of the teeth is of prime importance at any age. It would be preferable to treat an older patient with a favorable periodontal outlook than a younger person with an unfavorable supporting structure.

*Repositioning of Teeth*—Miller<sup>1</sup> has mentioned the necessity of repositioning teeth for biomechanical function and this measure has proved itself clinically many times.

A detailed analysis of the stresses transmitted to the alveolar bone has

<sup>1</sup>Miller, S. C.: Textbook of Periodontia, Philadelphia, The Blakiston Company, 1944, p. 66.



1. Case 1. Diastema between upper centrals due to lack of immediate replacement of missing lateral.

2. Treatment appliance for Case 1.

3. Appliance in position.

4. Case 1, completed.

been accomplished by Maxwell<sup>2</sup> in which he shows the tremendous forces that the alveolus must accept when teeth are out of alignment.

**Changes in Vertical Dimension**—1. It is sometimes necessary to make changes of a permanent nature in vertical dimension when reducing flaring anterior teeth which are malposed because of posterior collapse. In some cases of this nature lip pressure alone will effect treatment, once the vertical dimension is reopened.

2. A careful analysis of the patient's true centric relation, vertical dimension, and position of physiologic rest<sup>3</sup> is of utmost importance.

3. Rest position may also be influenced by habits which have overworked the muscular group controlling mandibular closure and corresponding weakening of the depressor group. Conditions of this type will tend to mislead the operator.

**Selection of the Appliance**—The design of the appliance will be limited by (1) the patient's tolerance, and (2) the operator's knowledge. The author finds the resilient type safer,<sup>4,5</sup> and more in harmony with adult bone metabolism than those applying positive initial movement, such as the edgewise types.

Anterior display should be kept at

a minimum. When it is possible, a lingual arch should be used in preference to the labial.<sup>6</sup> Because patients cannot withdraw from society during treatment, appearance is important. Sometimes removable appliances which are not generally advisable for children will solve the problems of esthetics, temporary vertical change, and ease of operation.

### Retainers

1. In cases where teeth are jumped retainers are usually unnecessary. In the posterior section the inclined planes of cusps will maintain the new tooth position. In the anterior segment the overbite will provide sufficient retention if the movement has

<sup>2</sup>Maxwell, George H.: *Physical Principles Underlying Periodontal Trauma*, Illinois Dent. J. 8:48 (Feb.) 1939.

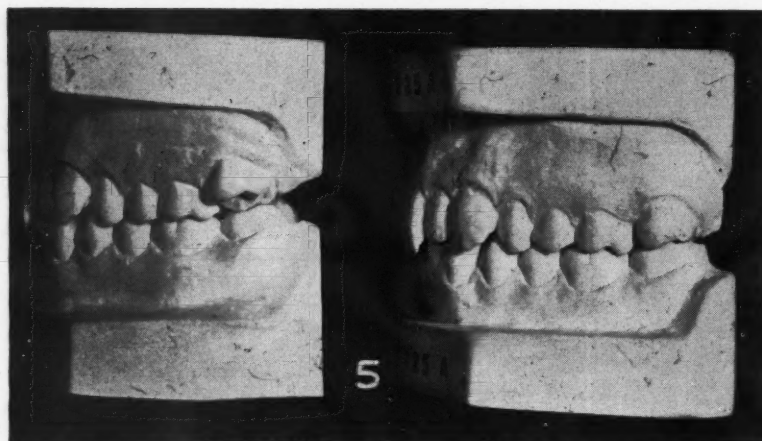
<sup>3</sup>Thompson, John R.: *The Rest Position of the Mandible and Its Significance to Dental Science*, J.A.D.A. 33:151-180 (Feb.) 1946.

<sup>4</sup>Griffen, Edm.: *Technique of Resilient Arch Assemblage*, Newark, N.J., Alpine Press, 1930.

<sup>5</sup>Johnson, Joseph E.: *The Treatment of Different Types of Malocclusion with the Twin-Wire Mechanism*, Am. J. Orthodontics 27:289-307 (April) 1941.

<sup>6</sup>Oliver, Irish Wood: *Labio Lingual Arch Technique*, St. Louis, C. V. Mosby Co., 1941.





5. Case 2. Cross bite relationship of second molar teeth before and after correction.

been one of changing a Class 3 to normal relationship.

2. When reconstructive procedures are to follow orthodontia, retentive requirements will be inversely proportional to the alveolar support. At times it is advisable to leave the original appliance in place as a retainer.

3. Temporary crowns can be tied in to the arch wire with ligatures, or if weakened support makes the tension more critical, the same type of attachment employed on the original band can be embedded in an acrylic temporary crown, or soldered to a temporary casting, thereby stabilizing the prepared teeth.

4. Modifications of the Hawley type retainer<sup>7</sup> are also employed and worn for as long a period of time as the case demands. When vertical dimension changes, or a reduced anterior overbite is desirable, a combination of the bite plane with a Hawley retainer can be used successfully in some cases. A transparent acrylic retainer as suggested by Sved<sup>8</sup> may be a convenient choice.

5. If fixed bridges are to be employed following orthodontic procedures, multiple abutments and as much splinting as possible are desirable. The more rigid the fixation the better.

6. Occlusal surfaces should be covered in order to equalize distrib-

ution of stress, as advised by Tylman.<sup>9</sup> Equilibration and balancing of occlusion is of prime importance in any type of case.<sup>10</sup> Biomechanical laws must be observed, especially if the vertical dimension has been reopened.

### Case Reports

Case 1—Female, age 26. Diastema between the centrals was caused by lack of immediate replacement of the lateral incisor after its removal.

Contraindications: A mesially overbuilt porcelain jacket on the left central would be unesthetic and possibly invite pulp involvement during preparation. The replaced lateral would be small and completely out of harmony with the overbuilt central.

Treatment: The simple appliance shown in Figure 2 tipped the left central to normal contact in less than one week. Bodily movement was unnecessary and is never attempted in adults whenever tipping movement will suffice.

The wires attached to the acrylic denture are round. Rotation during movement is prevented by the labial wire and the patient's lower teeth, giving a railroad track effect. The activating wire must have extremely light spring action. The appliance acted as

a retainer while a fixed bridge was constructed which replaced not only the lateral incisor, but also the missing first bicuspid (Fig. 4).

Case 2—Male, age 24. If overbite of offending teeth is not too severe, correction is comparatively simple and will save teeth that would eventually be lost due to traumatic malocclusion.

Treatment: Bands were placed on teeth to be moved. A hook was soldered on the buccal gingival surface of the upper from which a small elastic was run to a hook soldered on the lingual gingival surface of the lower. The hooks are placed to draw the teeth mesially or distally according to case requirements.

Inclined Planes Must be Retained: Grinding may be necessary during the course of movement but the inclined planes must not be destroyed as they will be the factors in maintaining the re-established occlusion. An exceptionally deep overbite in this area will indicate necessity for a temporary vertical dimension splint on the opposite side to prevent serious trauma to these teeth during movement.

Case 3—Female, age 40. The pulp and periodontal membrane of the upper left first bicuspid were involved and the removal of the tooth was indicated. The left central incisor presented the remains of a silicate restoration and there was recurrent caries on almost the entire distal surface. The patient reported a number of unsuccessful attempts at restoring this tooth because of the position of the adjacent lateral (Fig. 6). A porcelain jacket preparation for the central would also be impossible.

Treatment: In this case treatment planning involved not only orthodontia but increasing vertical dimension and complete posterior reconstruction. Part of the space created by removal of the bicuspid was utilized and the cuspid was moved distally about 2 millimeters to afford room to bring the lateral incisor into normal position.

Figure 7: The much more favorable position obtained by simple orthodontics is shown. Note also the

<sup>7</sup>Salzman, J. A.: Principles of Orthodontics, Philadelphia, J. B. Lippincott Co., 1943.  
<sup>8</sup>Sved, Alexander: Changing the Occlusal Level and a New Method of Retention, Am. J. Orthodontics 30:527-535 (Oct.) 1944.

<sup>9</sup>Tylman, S. D.: Theory and Practice of Crown & Bridge Prosthetics, St. Louis, C. V. Mosby Co., 1940, p. 216.

<sup>10</sup>Coleman, Robert E.: Equilibration of Occlusion in Orthodontics, Am. J. Orthodontics 34:791-811 (Oct.) 1948.

condition of the distal surface of the central incisor which was later treated and restored. The appliance is of the same basic principle as used in Case 1. The band on the upper left cuspid carries a small hook on the distal surface.

**Wire Pressure:** The patient was taught to engage the 25-gauge finger spring on the hook and it provided the distal drive. The wire which runs over to the lateral incisor was utilized to exert lingual pressure on the lateral after sufficient room was created. As no maxillary molars were present the clasps were placed on the bicuspid. Orthodontic time, three months.

**Case 4—Female, age 35.** This patient had been told that she was hopelessly past the age for orthodontic treatment. The fractured incisal angle on the upper left central (Fig. 8) is quite common in cases of upper anterior protrusion. Notice also the crowded lower anterior teeth and the

cross bite relation of the second right instead of one. Orthodontic time, one year. The next phase in this case was prosthetic vertical dimension change combined with splinting of the posterior teeth.

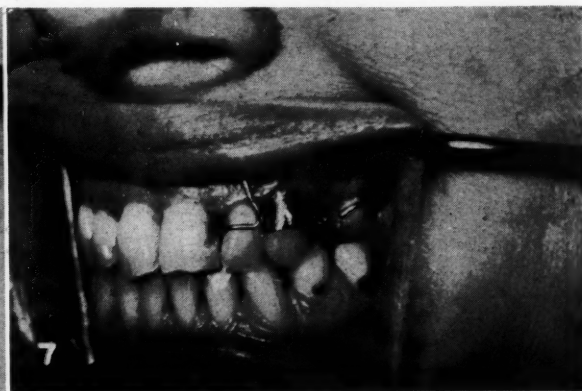
**Treatment:** The upper left first bicuspid was removed<sup>11</sup> and a Johnson appliance inserted. The upper left cuspid, lateral, and central were moved distally and lingually. The upper right center and lateral were rotated and moved lingually. The cross bite was corrected, the right bicuspid and cuspid were moved distally, and the crowding of the lower anterior teeth was corrected (Fig. 9).

**Figure 10:** Change in overjet is shown. Note also the lower right third molar which is present in the treated case. This tooth was unerupted because of the lack of room in the mandible. However, when mesial movement of the second molar was instituted, the third erupted uneventfully. The patient now has two functioning molars in the lower jaw in-

<sup>11</sup>Johnson, Joseph E.: Use of the Twin-Wire Mechanism in the Treatment of Cases in Which Extraction is Indicated. *Am. J. Orthodontics* 33:582-596 (Sept.) 1947.

**Case 5—Female, age 22.** The malocclusion shown in Figure 11 is not a true Class 3. This is an important diagnostic factor in treating cases of this type. Note also the gingival condition and caries of the anterior teeth. The latter caused pulp involvement of three upper anterior teeth. The former was due to the existing malocclusion and poor oral hygiene.

**Treatment:** After prophylaxis, the patient was taught proper tooth brush routine and root canal therapy on the pulpally involved teeth was performed. Fixed appliances were placed on both jaws and orthodontic movement activated. Coil-spring force and elastic traction brought the upper anteriors labially. The lower anteriors were tipped lingually.

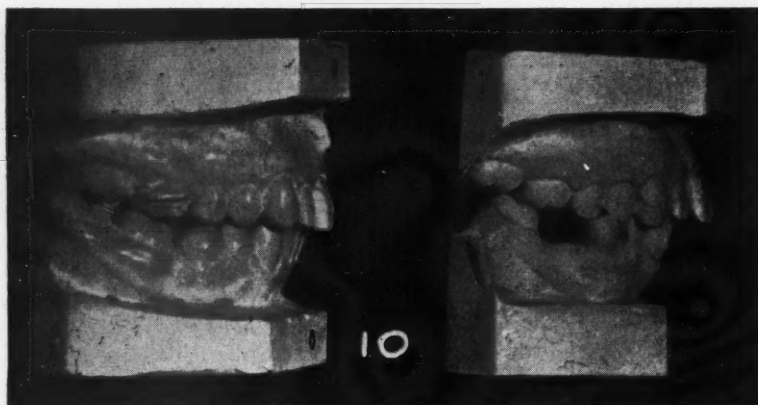


**6.** Case 3. Mesially tilted upper lateral incisor overlapping distal third of central.

**7.** Case 3. Treated with appliance in position.

**8.** Case 4. Before treatment with Johnson bands in position.

**9.** Case 4. Completion of orthodontic phase.



**10.** Right side, Case 4. Before and after treatment.

Figure 12: Note the pleasing appearance obtained following orthodontic treatment and porcelain jacket restorations of the pulpless teeth. Orthodontic time, seven months.

Case 6—Male, age 42. The anterior spacing shown in Figure 13 was created by excessive posterior wear and aggravated by a clamping habit. Two thirds of the alveolar support of the

upper anterior teeth were destroyed. As expected, these teeth were quite mobile. There was also excessive wear on the lingual surfaces of these teeth which took place before the loss of bone permitted them to extrude. The wear facets on the posterior teeth forced the patient to close in protrusion which further aggravated the condition.

Treatment: Vertical dimension was increased with metal splints and true centric relation was re-established. The upper anterior teeth were moved lingually into position with a Johnson appliance as shown in Figure 14. Elastic traction ran from the Johnson hooks to hooks soldered directly on the splints. The casting on the upper left cuspid is of a temporary nature. Orthodontic time, two months.

Vertical Dimension Maintained: The lower posterior teeth were then



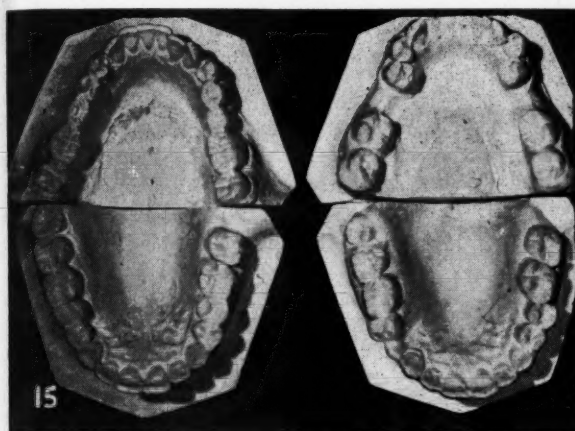
**11.** Case 5. Anterior view before treatment.

**12.** Case 5. Treatment complete.

**13.** Case 6. Before treatment.

**14.** Case 6. After vertical correction and orthodontic changes.





**15. Case 7. Before and after orthodontic and reconstructive treatment.**



**16. Case 7. Lateral view.**

prepared and received splinted cast gold veneer crowns, maintaining the established vertical dimension. The upper anterior teeth were prepared and received the same treatment, splinting the entire section to the cuspids.

**Case 7**—Patient female, age 35. In the author's opinion it is impossible to obtain a satisfactory functional result in an adult case of this type without the combination of orthodontics and reconstruction. The difference before and after treatment is clearly shown in Figure 15 (occlusal view) and Figure 16, left lateral view. Since the right lateral section is virtually the

same as the left, photographs of the right side have been omitted. The malposition of the upper and lower bicuspid are not only unsightly, but also a forerunner of alveolar destruction.

**Treatment:** Large compound restorations with defective margins, and recurrent caries were present in every posterior tooth. By cutting the approximal surfaces of these restorations space was obtained and the upper bicuspid teeth were brought into proper position. The treated case shows the difference in alignment after orthodontia and the insertion of properly constructed replacements. The old de-

fective restorations were replaced by hard gold inlays. The replacements in the lower jaw are of a fixed nature.

**Correction Permanent:** Periodontal disease which was beginning to develop when the case was presented for treatment has not progressed to any extent, and all teeth are firm after thirteen years of regular observation. Appliances used were of a fixed nature with the exception of the Hawley type removable anterior bite plane which gave vertical clearance while the bicuspid teeth were moved into position. Orthodontic time, eight months.

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## ***Dental Treatment***

### **of the CEREBRAL PALSIED CHILD**

AARON A. MOSS, D.D.S., Bernardsville, N.J.



**1. Instrumentarium: (1) Denhardt mouth prop. (2) Molt's mouth prop. (3) McBride finger protector. (4) Large wood wedge (designed by author). (5) Small wood wedge (designed by author). (6) De Pass rubber mouth prop (large size). (7) De Ford mouth prop. (8) Rubber mouth prop (child's size).**

#### **DIGEST**

*This article stresses the importance of establishing a confident and friendly relation with the cerebral palsied child to be treated. Because of lack of muscular control and exaggerated nervous reactions these children are especially difficult to hold in position while undergoing dental treatment. The means the author has found in his own experience to be best adapted to this purpose are discussed in detail. The instruments used and the procedure followed are described.*

#### **Problem of Treatment**

The dental care and dental treatment of cerebral palsied children present a special challenge to the dental profession for the following reasons:

1. Many of the children present an emotional problem, particularly those who are at home with their families in contact with unhandicapped children and adults.

2. Many of them have speech or hearing difficulties and at times are completely deaf, or dumb, or both.

3. They have no control of their flow of saliva and some of them drool continually.

4. They cannot control their muscles so that their heads and bodies are in constant motion with their heads uncontrolled against the headrest of the dental chair.

**Exaggerated Reflex Reaction—**Many of these children go into a momentary spasm with the slightest stimulus, such as contact with the extremity or the slamming of a door. Because of the lack of muscular control their jaws, when open, may suddenly snap closed and injure the op-

erator's fingers or themselves. At other times their jaws are so tightly clenched that it is impossible to force them open without special means.

**Complicating Factors**—The handicaps described are further complicated by the fact that because of the heavy medication which they must take and because of their inability to apply their own oral hygiene, these children have a somewhat higher incidence of dental disturbance, frequently including periodontal conditions. Many of the children, because of jaw rigidity, have flatly ground teeth, characteristic of bruxism.

### Two Phases of Treatment

The dental care of cerebral palsied children is on two levels, (A) preventive, and (B) corrective.

**Preventive Treatment**—Periodic examinations should be made and prophylaxis should be done. Manuel M. Album<sup>1</sup> recommends periodic applications of 2 per cent sodium fluoride as outlined in the technique suggested by the U.S. Public Health Service.

In cases of periodontal disturbance it is particularly important to follow strict oral hygiene. Frequently, the attending nurse, or parent, as the case may be, must take complete responsibility for daily care, including tooth brushing.

Frequent examinations are not only important as preventive measures but they serve to make an opportunity for dentist and patient to become acquainted, thereby relieving some of the child's emotional tension.

**Importance of Winning Confidence**—The author has on several occasions entertained the children at the Walter Matheny School by playing the violin,



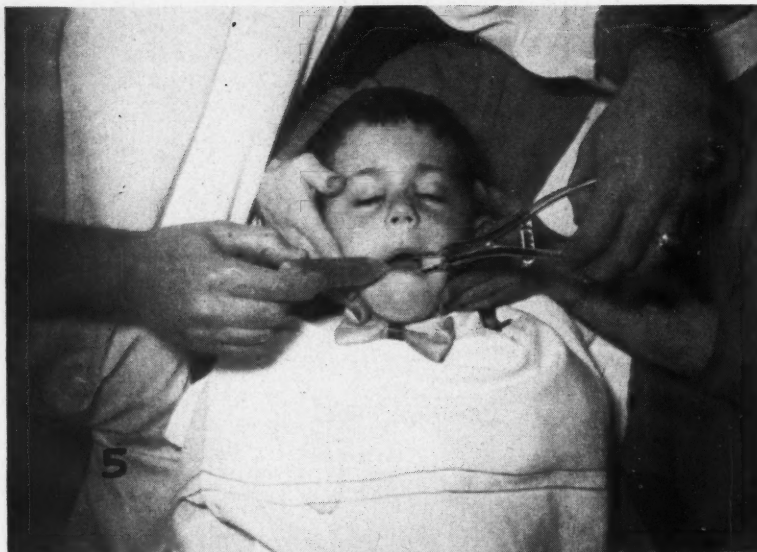
**2.** Patient is seated in lap of the attendant with legs between the knees of the attendant and the patient's hands restrained by the hands of the attendant.

**3.** Position of head is slightly above shoulder level of the attendant and to one side. It is held firmly in place by the hands of the assistant.

**4.** Prying wood wedge between teeth to force opening.

<sup>1</sup>Album, Manuel M.: Why Dentistry for Cerebral Palsy, J. Dent. Children 27:2nd quarter, 1950.





singing, and leading them in group singing. This is not a procedure that could be followed in most instances but it indicates one means of lessening emotional stress by being accepted by the children as a friend.

**Corrective Treatment**—This phase of treatment will not be discussed as it should equal the high standards of children's dentistry commonly practiced. The method of controlling and handling the cerebral palsied child, however, is a phase of dentistry which at present is not generally presented in the dental literature.

### **Preparation for Treatment**

Premedication has proved highly successful in the author's experience. The drug of choice is seconal® with a dosage of  $\frac{3}{4}$  grain to 3 grains depending on the age and size of the child. There are some cases where, because of necessary daily medication, as much as 6 and 8 grains of seconal have almost no depressant effect.

**Establishment of Optimal Medication**—Through trial and error with each individual child, the optimal dose for each can be established. This information, together with the time required for satisfactory results, should be recorded on the child's dental record.

**Several Assistants Required**—The proper seating of the patient in the chair and the maintenance of the position for the length of time necessary to complete the dental service is the most difficult problem in treatment of the children. Sometimes three others in addition to the dentist are required: 1. An attendant on whose lap the child is seated and who has the responsibility of controlling the child's body, arms, and legs. 2. An assistant to hold the child's head and to maintain the mouth prop and

**5.** Inserting De Ford prop into space created by wood wedge.

**6.** Replacing De Ford prop with the Denhardt mouth prop.

**7.** Denhardt mouth gag in position gives excellent view of working field. The prop is held in place by the hands of the assistant who also holds the head firmly in position.

**8. McBride finger guard affords flexibility and free finger and permits the use of the index finger in the mouth.**

clamps in position; to keep the jaws open to prevent them from snapping shut. 3. An assistant or chair nurse to assist the dentist with actual operation in the mouth, such as (1) preparation of materials, (2) holding cotton roll in place, (3) keeping the tongue out of the field of operation, and (4) illumination (Fig. 10).

### Procedures

**1. Seating the Patient**—If the patient is an adult or grown child he can be seated in the dental chair in the conventional way. If the patient is a young child up to the age of fourteen, he must be seated in the lap of an attendant with his legs together, placed in such a way that they can be held between the knees of the attendant. His hands should be grasped from above by the hands of the attendant. This will restrain the body, arms, hands, and legs and feet (Fig. 2).

**2. Maintaining Head Position**—The patient's head should be held against the chest of the attendant by an assistant who places one hand on either side of the face. The head should be held firmly to one or the other side of the attendant whichever is most convenient for the operator. If possible the head should be slightly above the shoulder so that it can be held in a position with the face upward (Fig 3).

**3. Opening the Mouth**—It is often an extremely difficult problem to open the patient's mouth, particularly in the athetoid or rigidity type of spastic case where the jaws are tightly clenched. The following steps may be taken:

1. A wooden wedge especially designed by the author in two sizes, large and small, is used for this purpose (Fig. 1). While the head is firmly



ly held by the assistant the dentist forces the pointed wedge between the teeth sufficiently to pry the teeth apart. With a slight turn a separation is made large enough to put a De Ford mouth prop into the mouth.

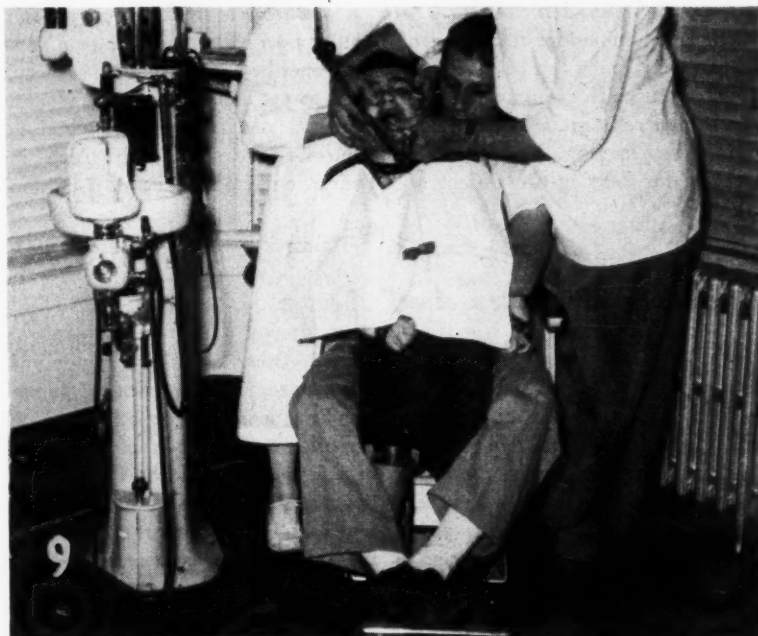
2. The opening is widened enough to insert any one of the following props or gags: (1) De Pass rubber mouth prop, (2) Molt's mouth gag, or (3) the Denhardt mouth prop.

**Use of Instruments:** The two latter instruments are the ratchet type and remain open when set. They can be released by pressing a small lever.

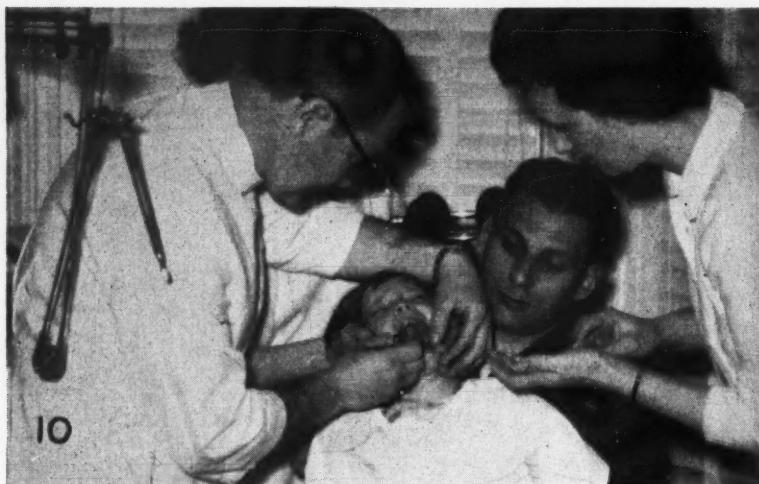
The mouth gags are held firmly in

place by the assistant, using the same hand that holds the head in position. After the instrument is set and firmly in position the De Ford mouth prop may be removed. The mouth is now open and ready for dental treatment. With a little practice the entire procedure can be accomplished in a few moments (Figs. 4, 5, 6, and 7).

**Restraint Necessary:** With the proper restraining teamwork, the tension and difficulty in maintaining the necessary position of the child for dental treatment is well balanced and sustained with a minimum of fatigue to those involved. The danger of the jaw



**9. Conditions permit a high quality of dentistry. View showing how the body, head, and mouth are maintained with minimum strain to those concerned.**



**10.** *Crossing of the attendant's legs is sometimes necessary to prevent the patient's legs from slipping out of position. Note the working team of four people required.*

snapping shut is eliminated when the mouth gag is held firmly in place against the side of the face by the assistant.

**Finger Guards:** In the athetoid or rigidity type of spastic the rubber mouth props are not used, as they can be more easily dislodged. The McBride finger guard is frequently used (Fig. 8). This has three advantages: (1) The props and gag are eliminated, (2) flexibility of the guard permits movement of the index finger while it affords complete protection to the fingers. A sewing thimble on the end of the finger may also be used for protection.

### **General Considerations**

Proper illumination, retracting of the tongue, keeping the field of operation dry usually requires the help of a second assistant, making a team of four people (Fig. 10). The time duration for keeping the patient re-

stricted depends on the individual subject but it is advisable to stop frequently and give both the patient and the operating team a rest.

**Use of Procaine**—Although it is sometimes used, most children in their premedicated condition are able to tolerate drilling fairly well, making procaine unnecessary. At most, a child is never treated for more than twenty-five or thirty minutes at a time. In this length of time, with the technique described, it is possible to make from two to six deciduous restorations at a sitting or the same number in permanent teeth. In general, as much as can be reasonably tolerated is accomplished at each sitting.

**Anesthetics in Minor Surgery**—The author uses either procaine or a general anesthetic for minor surgery, such as extractions. Under a general anesthetic the most difficult child to control relaxes completely. Also, in their strongly premedicated condition

the amount of anesthetic required to produce relaxation and surgical anesthesia is relatively small. For this purpose the author uses nitrous oxide and oxygen, in combination with a synergist, such as ethyl chloride. For longer operations neurolene may be used as a synergist. A high per cent of oxygen, ranging from 20 per cent to 50 per cent, is possible, eliminating danger of hypoxia and possible injury to the already impaired brain tissue.

### **Conclusion**

Treatment of the cerebral palsied child is a challenge to the dental profession and must be given special consideration because of his physical and emotional handicap. These children are lovable and sensitive and should be dealt with kindly. They sometimes cannot understand or hear what is said to them and it is difficult for them to communicate their thoughts; but they can easily read the moods and attitudes of other people and with a little patience the dentist can learn to understand their modes of communication.

The technique described, in addition to kindness and patience, makes it possible to accomplish high standards of dentistry with safety and a minimum of strain for the patient and the dentist.

20 Morristown Road.

## **Focal Infections and Acne**

FREQUENTLY occurring at an age when acne appears are focal infections in impacted and unerupted third molars and in tonsils. Especially in patients 19 years of age and over, the third molars should be carefully x-rayed and examined. In older patients, pulpless teeth should be held under sus-

picion. Other foci are rarely of importance. Many cures of long-standing acne can be attributed to careful search for and removal of foci of infection. In a series of 384 patients studied, a foci of infection was found in 45 (11 per cent). Of these, the teeth were involved in 29 (64 per

cent), the tonsils in 13 (28 per cent), and the sinuses in three (8 per cent) of the cases.

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## **Problem of**

# **"THE CLICKING JAW"**

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### **Dental Factors in Lesions of the Temporomandibular Joint**

A growing appreciation in recent years of the importance of dental factors in the etiology of many lesions of the temporomandibular joint is resulting in the direction of these cases to the dental surgeon.

The purpose of this paper is to consider more closely the symptoms which definitely accompany disorders of the temporomandibular joint, in an endeavor to show the mechanism of their production and indicate a rational approach to their prevention and treatment.

### **Symptomatology and Clinical Findings**

In a series of consecutive cases the patients may be grouped according to the following presenting symptoms:

- (1) Painless clicking during the opening phase.
- (2) Intermittent "locking" during which the opening is temporarily limited to about one fingerbreadth and usually accompanied by pain.
- (3) Limitation of opening with pain with a history of previous symptoms.
- (4) Limitation of opening with pain without previous symptoms.
- (5) Clicking, or more accurately, jolting, at maximum opening and again at the beginning of the closing phase.
- (6) A combination of (1) or (2) with (5).

*Group 1*—A typical patient in the

first group is in the late teens or early twenties with the following history:

- (1) The clicking began suddenly and spontaneously, or it came on after some injury.
- (2) The noise is quite often loud and may be audible to others as well as to the patient.
- (3) It usually occurs when the mouth is about half-way open, but it may occur anywhere from quite early to almost the end of the opening movement.
- (4) The patient is aware of a feeling of obstruction during the movement of opening, the click occurring as the obstruction is overcome.
- (5) The rest of the opening movement and the whole of the closing movement are free of symptoms.
- (6) Careful palpation or auscultation over the joint reveals that in addition to the loud noise during opening there is a faint click during the final 2 or 3 millimeters of the closing movement.

**Dental Features:** In the majority of cases there is a deep overbite resembling that of Angle's Class II Division 2. Often some or all of the molars have been lost. In some cases with apparently well-formed dental arches, the first molars that have been lost early to obviate crowding appear to be responsible for the deep overbite. In an otherwise normal mouth there is sometimes a single dental factor, such as a misplaced tooth, which prevents the teeth coming together into their normal occlusal relationship. In nearly all except these last instances the freeway space is larger than normal.

**Radiographic Description:** The condylar head appears to be posterior to its normal position and there is a backward movement of the condyle as the mandible moves from the rest position into the position of occlusion.

**Clinical Feature:** In this type of case if the teeth are prevented from coming into occlusion by placing something between them, as by a thin rod held across the upper arch in the cuspid region, the clicking is eliminated.

**Presence of Pain:** When the clicking has been present for a long time, especially in women of neurotic type, pain over the area of the joint may be a feature.

*Group 2*—A patient in the second group presenting himself for the first time has the following complaints:

- (1) The jaw becomes locked, usually on waking, and for a time the mouth can only be opened a few millimeters.
- (2) He has severe pain over the affected joint which is made worse by attempts to open the mouth wider.
- (3) By making some maneuver of the jaw, often by pressure over the joint, the patient is able to "unlock" the jaw and restore normal movement. The pain and tenderness persist for a time.
- (4) In nearly all cases there is a history of clicking of the affected joint and when examined while the jaw is free the clinical findings are identical with those of the first group.

**Change in Symptoms:** Sometimes the change in symptoms appears to have been spontaneous but more often there is a history of some trauma though this may have been slight:

- (1) A light blow on the chin, (2)

attempting to take a large bite of a hard apple, (3) the free gratification of an inclination to yawn or sneeze.

**Effect of Dental Extraction:** Quite often there is a history of a recent dental extraction. This need not necessarily have been a difficult extraction of a lower molar, although that may well be the precipitating factor. On the contrary, when only one or two molars are in occlusion the loss of an upper molar may have a profound effect on jaw function and thus precipitate symptoms.

**Group 3—**Seen within a few days of the onset of symptoms a patient in the third group complains of the following: (1) Continuous aching pain centered over the affected joint radiating down to the angle of the jaw and often also to the side of the head and to the ear; and occasionally to the mastoid region. (2) The opening of the mouth is limited to about one fingerbreadth which makes eating difficult as well as painful. (3) Usually there is a history of painless clicking for some months or years with recent episodes of temporary "locking" which have become more frequent and increasingly difficult to "unlock." On the last occasion the usual maneuver by which the patient was previously able to "unlock" the jaw, failed. (4) Examination reveals tenderness over the joint and often hyperesthesia over the temporal and parotid regions.

**Deviation of the Mandible:** The limited opening which no longer causes any clicking is accompanied by deviation of the mandible to the affected side. Lateral movement of the mandible to the opposite side is limited and increases the pain while lateral movement toward the affected joint is usually full and without pain.

**Movement of the Condyle Observed:** There is clearly an obstruction to the forward gliding movement of the condyle on the affected side. Careful observation of the teeth as they come into occlusion may reveal that this is accompanied by a lateral movement.

**Radiographic Description:** X-rays show that the condyle, posteriorly displaced when the teeth are in occlusion,

as in Group 1 cases, does not move forward when the mouth is opened. It sometimes descends vertically for a short distance, the joint space remaining appreciably wider than normal.

### **Type 1 Cases**

**The Same Underlying Process—**It is evident from this discussion that the symptoms of the first three groups correspond to the first, second, and third stages of the same underlying process. Together they constitute what will be called Type 1 cases. It should be noted that although Type 1 cases usually go through all three stages they occasionally start at the second or even at the third. In the latter event it becomes extremely difficult to distinguish the case from one belonging to Group 4.

**Group 4—1.** Symptomatically Group 4 cases are similar to those of Group 3 but they are usually distinguishable by the absence of (1) history of clicking, and (2) abnormalities of either teeth or jaws. Except for the limited forward gliding of the condyle on the affected side and some widening of the joint space there is no radiographic abnormality.

2. The pain, which is severe, is sudden in onset, usually while eating or following a severe blow on the jaw. There may be slight swelling over the affected joint. Another distinctive feature of the Group 4 cases is the tendency to settle down spontaneously after a few weeks, leaving no abnormality.

**Group 5—**Patients in this group experience what may be described as

a jolt of the mandible sometimes accompanied by a noise which is more of a hollow knock than a click, just as the maximal opening is reached and again as the closing movement commences. It is usually bilateral and the "jolts" on the two sides are not quite synchronous but follow one another in rapid succession so that the mandible is seen to perform a small jerk to one side and then back to the midline.

**Test Ineffective:** The simple test which eliminates clicking in the Type 1 case is without effect. Pain is not usually a feature of these cases and many patients are unaware that their jaw movement is abnormal.

**No Radiographic Distinction:** The jaw movement in these cases is indistinguishable from the normal movement in which the condylar head rides well on to the antero-inferior surface of the articular eminence when the mouth is fully open.

**Clinical Distinctions:** The fourth and fifth groups are seen to be clinically distinct from each other and from the Type 1 cases and will be called Types II and III respectively.

**Group 6—**In this group cases in which the symptoms of either the first or second group are combined with those of the fifth are not uncommon. They possess most of the clinical features of the Type 1 case and run a similar course.

### **The Mechanism of Clicking**

**Structural Features—**In its simplest terms the temporomandibular articulation is a hinge joint in a movable socket; the fibro-cartilaginous disc is

#### **Original Six Groups**

- |   |           |                 |
|---|-----------|-----------------|
| 1. Painless clicking during opening phase                                       | 1st stage |                 |
| 2. Intermittent "locking"   | 2nd stage |                 |
| 3. Limitation of opening with pain with history of previous symptoms            | 3rd stage | Type I          |
| 4. Limitation of opening with pain without history of previous symptoms         |           | Type II         |
| 5. Click or jolt occurring at maximum opening and again as closing phase begins |           | Type III        |
| 6. Combination of 5 with 1 or 2   |           | Types III and I |

attached firmly to the condyle at its poles so that normally it follows the condyle in all its movements and allows only a simple hinge movement to occur in the lower compartment of the joint.

**Fibro-cartilaginous Disc:** The upper surface of the disc articulates with the postero-inferior surface of the articular eminence. It is only the thin central part of the disc which is concerned in withstanding such pressure as is transmitted to the joint during biting and chewing. Behind and above this thin central part the disc is thickened and softer, forming a cap on the condyle. Behind this thickening the disc thins rapidly and is blended with the capsule. Below and anterior to the thin central part there is another less well-marked thickening of the disc to which part of the lateral pterygoid muscle is inserted through the capsule.

**Forward Gliding Movement Permitted:** The capsule allows considerable free forward gliding movement in the upper joint compartment during which the condyle rides not only on to the summit of the eminence but often some distance on to its antero-inferior aspect. Some rotation of the condyle about its vertical axis and some lateral movement, the Bennet movement, is also possible.

**Movement in Opening the Mouth—**The normal movement in opening the mouth is brought about by a combination of hinge movement in the lower compartment and forward gliding in the upper. It has been shown that the movement of the mandible from the position of occlusion to the rest position is a pure hinge movement. Beyond this point gliding movement is increasingly evident, becoming predominant as maximal opening is approached. During closure this order is reversed and again the mandible passes from the rest position to the occlusal position by a pure hinge movement.

**Articulation of the Mandible—**It is important to view the articulation of the mandible with the base of the skull as a single entity. Not only are there two mandibular joints coupled together, but the two complexes also articulate through the teeth attached

to them. When the mouth is open the mandibular joints and muscles and ligaments attached to the mandible, as well as the force of gravity, determine the position and path of movement of the mandible. When the teeth are in contact they dictate the position of the mandible.

**—Cause of Deviation—**Because of the mutual effect of the articulation of the teeth and the mandibular joints during development a high degree of harmony normally results, so that when the mandible moves from the rest position to the occlusal position the teeth meet exactly in their correct relationship. It will readily be seen that conflict between the "needs" of the joints and the "dictates" of the dental articulation may arise. Thus, pain caused by biting on the gum flap over an erupting wisdom tooth may compel the patient to adopt a "bite of comfort" in which the teeth are brought together with the mandible deviated to one side. An over-erupted upper wisdom tooth, when the lower is missing, may impinge on the distal aspect of the lower second molar and cause a forced lateral deviation of the mandible to the opposite side each time the teeth are brought into occlusion.

**Increase in Freeway Space—**Loss of posterior teeth may allow the bite to close and cause the mandible as a whole to be forced in a backward direction by the action of the inclined planes of the incisors. Since the rest position of the mandible is virtually constant this closing of the bite results in an increase in the freeway space, and the movement of the mandible from the rest position to the occlusal position is no longer a pure hinge movement. The condyles are driven into a position above and behind their normal position in relation to the articular eminence. Only one condyle is affected when a unilateral cause is responsible, but when the bite has closed, both are affected.

**Compensatory Changes—**If growth and development of the condyle and teeth have not ceased compensatory changes may occur to restore harmony. The fact that only a small proportion of people who have lost pos-

terior teeth develop joint symptoms suggests that such compensatory changes frequently occur. If only a single tooth or perhaps two teeth are responsible for the forced movement, the conflict may be resolved by the loosening of these teeth and the appearance of localized paradental disease. When the teeth do not give way and compensatory changes cannot occur, the condyle is forced into the abnormal position hundreds of times a day and the structures of the joint are subjected to a constantly recurring strain. In patients who grind their teeth during sleep there is no respite for the joint.

**Important Link—**The joint itself must be regarded as an important link in the proprioceptive mechanism coordinating the action of the muscles of mastication. Any disturbance of the joint is therefore likely to interfere with muscular coordination and cause abnormal forces to be transmitted to the joint. This will tend to perpetuate and even increase the joint disturbance. The use of anterior teeth only also imposes an added load on the joint.

**Effect of Altered Mechanics—**As in other joints, prolonged excessive stress and altered mechanics of the joint ultimately cause degenerative changes. In the temporomandibular joint this leads to loosening of the attachments of the disc to the condyle. Only a slight injury, which would be quite without effect on the normal joint, is then needed to start the train of symptoms described in the Type I case.

### **Cause of Click**

With the attachment of the disc to condyle loosened, as described, the disc is no longer compelled to follow the condyle when it moves into its abnormal position, so that during the final few millimeters of the closing movement the thickened upper part of the disc rotates forward to lie between the condyle and the postero-inferior surface of the eminence. This movement of the disc causes the faint click. In some people it is actually possible to feel what is certainly the edge of the disc being thrust laterally and forward when this occurs.



**Opening Movement Free of Click—**When the mouth is opened the normal relationship is not immediately restored but the disc and condyle move together, both pulled by the lateral pterygoid, for a variable distance on to the postero-inferior surface of the articular eminence when pressure on the thick part of the disc and tension on its posterior attachment to the capsule causes the disc to slip back with a snap into its correct position on the condyle.

**Aim of Treatment—**During the rest of the opening phase and all but the last two or three millimeters of the closing phase, the condyle and disc maintain their correct relationship. If this final two or three millimeters of the closing movement is prevented, the relationship of the condyle and disc is not disturbed and both opening and closing movements are free from clicking. This is, of course, what happens in the simple clinical test mentioned earlier, and in treatment the aim is to provide some permanent means of preventing the abnormal final part of the closing movement.

**Additional Trauma—**Once the disc has been sufficiently loosened from the condyle for clicking to occur the possibility of further damage to the joint is greatly increased. Not only is the posterior part of the disc subjected to pressure which it is ill fitted to withstand, but the disc and condyle undergo additional trauma each time the click is produced. These factors alone may be enough to cause a low-grade traumatic arthritis in the joint. Further loosening of the disc increases the difficulty of restoring the correct relationship of the disc to the condyle after displacement which inevitably leads to the symptoms of intermittent locking, the thick upper part of the disc remaining temporarily in front of the condyle acting as an obstruction to its forward movement.

**Clinical Osteoarthritis—**In the third stage where the locking has become permanent the disc is no longer a gliding socket for the condyle and even the hinge movement occurs in an abnormal socket ill fitted for such a purpose. This represents a severe disturbance of the mechanism of the

joint. Not only will it give rise (1) to pain in and around the joint, and (2) to reflex pain particularly in the area of distribution of the auriculo-temporal nerve which supplies the joint, but (3) limitation of movement of the one joint will impose a severe additional burden on the other which ultimately may also give rise to symptoms. The low-grade inflammatory process due to the constant trauma to the soft tissues of the disorganized joint may also ultimately give rise to bony changes in the condyle. Clinically, the picture will then be one of osteoarthritis.

**Type II—**What happens in Type II where painful limitation of opening starts suddenly while eating, without previous symptoms, can only be guessed. Perhaps as a result of some unguarded uncoordinated movement the disc gets severely nipped in some way, or more likely, a villus of the synovial lining gets nipped in the joint. If there has been a severe blow on the jaw the explanation is simple.

**Acute Traumatic Arthritis—**Clinically, the result in any case is an acute traumatic arthritis with an effusion into the joint cavity or cavities. It has already been noted that in this type and in the painful stage of Type I the mandible may make a lateral movement caused by a misplaced tooth. The effusion and edema of the soft tissues within the joint have caused some separation of the joint surfaces and shifted the axis of rotation of the mandible.

**A Manifestation of the Lesion—**In other words the lateral movement is a manifestation of the lesion in the joint, not as in the other instance, its cause. It is clearly important to recognize this distinction and avoid the error of grinding the teeth to make them harmonize with the temporarily deranged joint. With rest the condition tends to settle down and return to normal.

**Type III—**In Type III the condition may be regarded as a subluxation of the joint. The condyle moves well beyond the summit of the articular eminence but instead of doing so smoothly, as in many normal cases where the condyle reaches this point,

it does so with a jerk. A similar jerk occurs when the condyle passes the summit of the eminence during closure.

**Uneven Movement of the Condyle—**During the opening movement the elevator action of the muscles seems to be insufficiently inhibited and the pull of the lateral pterygoid too strong while in the closing movement the elevator parts act strongly before the retracting parts of the muscles have brought the condyle behind the summit of the eminence.

**High Degree of Coordination Required—**To accomplish this part of the movement smoothly a high degree of coordination of muscle action is necessary. A relatively slight injury, such as may be caused by dislocation during a dental extraction under general anesthesia, may well upset the delicate neuromuscular mechanism and start this jerky movement.

**Voluntary Click—**Some people can produce an impressively loud snap or click in their temporomandibular joints voluntarily. The mechanism by which this is done is similar to that in the type under consideration, except that the muscular incoordination is deliberate: 1. The mouth is opened wide so that the condyle is a little in front of the eminence. 2. The elevator parts of the muscles are then made to act strongly a little before their retracting effect is brought into play. 3. In this way the condylar head is made to spring back as soon as it reaches the summit of the eminence.

**Traumatic Effects of Abnormal Movement—**In the involuntary condition the abnormal movement is injurious to the structures of the joint and tends to perpetuate the trouble and even make it progressively worse: (1) This is particularly likely to occur when there is a large over-jet between the incisor teeth and the mandible must be protruded to its maximal extent when biting on the front teeth. In this position the condyle is no longer firmly supported on or behind the summit of the eminence and the joint structures are subjected to abnormal stress. (2) The condition may become a true luxation, or by weakening the attachment of disc to condyle may

predispose to clicking of the first type described.

Fortunately, the patient usually avoids opening the mouth to its maximum extent and the progress of the condition is interrupted with, in some cases, a spontaneous return to normal.

### Treatment

In Type I should there be a normal freeway space, treatment consists in a search for and elimination of, causes of a "bite of comfort" or a misplaced tooth causing a forced deviation of the mandible as the teeth come into occlusion. This is usually not difficult but in some cases it is worth while to adopt the procedure described as "bite analysis." Success with this procedure is entirely dependent on the accurate registration of the rest position of the mandible.

*Type I Cases with a Large Freeway Space*—Treatment consists in making a bite splint or bite plane which prevents the mandible from closing more than 2 millimeters beyond the rest position. In this way the forced backward movement of the mandible and condyles is prevented and in the majority of cases painless clicking eliminated.

**Object of Treatment:** It cannot be too strongly emphasized that this is not the same as bite-opening, the object is rather to fill in the abnormal freeway space and restore the mandible to its correct working position.

**Use of a Partial Lower Denture:** If the lower molars are missing a partial lower denture with extensions over the occlusal surfaces of the premolars can be used. If all the teeth are present the bite splint can be made to cover the occlusal surfaces of the upper molars and premolars. Such an appliance is better tolerated in the upper jaw and it interferes less with speech.

**Procedure**—1. At the bite stage in the construction of the splint or denture, measurements are made between marks on the face, or better still, on the incisor teeth when the mandible is in the rest position.

2. The bite-rims are built up and trimmed to give fairly uniform con-

tact and to prevent closure beyond the rest position.

3. With only the surface of the wax softened, the patient closes, biting lightly a further 2 millimeters into the wax. The patient must be sitting comfortably and relaxed with the head unsupported.

4. The bite-rim must be replaced after cooling and the closing movement repeated several times to make sure that each time the teeth pass exactly into the same position as they come into contact with the wax without any lateral deviation.

5. If the clicking is not eliminated the procedure should be repeated, allowing only  $\frac{1}{2}$  to 1 millimeter closure beyond the rest position. If, as sometimes happens, this still fails or only partly succeeds in preventing clicking, one must on no account be tempted to build up the bite beyond the rest position as this may have disastrous results.

6. The bite splint is processed in clear acrylic. A lingual or palatal bar is used to keep the appliance as small as possible. The occlusal surface of the splint is trimmed so that only a shallow impression of the cusps of the opposing teeth remain.

7. Such a bite splint should be worn all the time and on no account be left out at night.

**Permanent Prosthesis:** If the appliance has proved successful after being worn for several months, the question of some more permanent prosthesis must be considered. Whether this takes the form of a removable denture or fixed bridges, it is well to remove all misplaced tilted teeth from the opposing jaw, so that there is a reasonable chance of restoring a good articulation by making the prosthesis to replace these and other missing teeth, at the same time as the permanent replacement of the bite splint is made. This work is best carried out using an anatomic articulator with face-bow registration and using the temporary bite splint when mounting the study models in the centric position.

**Preventive Treatment:** It is among cases with painless clicking and intermittent locking that dental treatment

has the best prospect of success. Whenever possible treatment should be begun at this stage. Ideally, much could be done by orthodontic and prosthetic treatment to prevent the development of a potential case.

**Third Stage of Type 1**—If a patient is seen shortly after the onset of painful limitation of movement it is worth while to attempt to reduce the displacement of the disc. A general anesthetic may be needed for this. If this treatment is successful the mandible should be immobilized in the rest position for about two weeks and then be treated as a first or second stage case.

(At the onset of this condition the patient may experience severe pain. It is one of the few instances among these conditions where a course of shortwave diathermy to the joint and muscles affords relief.)

**Alternative Procedure:** If the measure described is not successful in restoring normal movement or the condition has been present for some time, the first step is to construct a bite splint in the same way as that described, but with a smooth occlusal surface. This will not only prevent the forced movement of overclosure but will eliminate all lateral stress and allow the mandible to take up its new position as edema within the joint settles down. When the patient is free from pain and regains sufficient mobility in the joint to eat without undue difficulty, the construction of a permanent appliance, as outlined, can be undertaken.

**Surgical Treatment**—After a reasonable trial of the measures presented if the pain or the limitation of movement, or both, are unrelieved, surgical treatment must be considered.

**Condylectomy:** At the Maxillo-Facial Unit at East Grinstead, in cases of long standing, especially with severe limitation of movement or bony changes in the condyle, condylectomy has been found to give better results than extirpation of the disc. It is important to regain good movement in the false joint following condylectomy by using a training flange attached to a lower cast cap splint.

**Extirpation of the Disc:** Although

this measure has a place in the treatment of the early case with extirpation of the disc there is a tendency for symptoms to return with crepitation in the joint after months or years. Every effort must be made to establish a sound functional dental articulation after operation in order to make the best of the new joint and to try to save the other joint from a similar fate.

**Type II Case**—In acute traumatic arthritis (1) immobilization in the rest position, and (2) a course of shortwave diathermy to the joint, ensure speedy relief from pain and a more certain and rapid restoration of normal function than if the mandible is left free. If the patient is not willing to have his jaw immobilized a bite splint with a smooth occlusal surface may be used. The splint is worn only until the pain is gone.

**The Third Type of Case**—In the last type of case if the subluxation is of a mild degree no treatment except an injunction to the patient to avoid opening his mouth to the full extent

may be necessary. If there is a marked over-jet of the incisor teeth it would be rational to correct this.

In the Severe Case: There is an unattractive choice between several forms of surgical treatment and the use of a sclerosing agent injected in the joint. They have as their objective the limitation of the forward gliding movement of the condyle and are more or less successful in doing this whether it is by (1) an osteoplastic operation to produce a bony stop on the summit of the eminence, (2) by dividing the attachment of the lateral pterygoid, or (3) by making a fascial sling around the joint. When it is recalled that a simple arthrotomy also produces limitation of movement of the jaw, it is clearly difficult to assess the merits of a particular operation.

**Use of a Sclerosing Agent:** The use of a sclerosing agent injected into the joint has the merit of simplicity and freedom from the risk of injury to the facial nerve involved in any operative procedure on the joint. It cannot,

however, be warmly recommended as it undoubtedly achieves its effect by causing an acute arthritis which results in adhesions within the joint as well as the periarticular fibrosis claimed for it by the originators of the treatment.

### Summary

The relatively common lesions of the temporomandibular joint have been considered. Only a brief reference has been made to the neurotic element which is often an important feature. Edentulous cases have not been dealt with separately as they do not differ essentially from those discussed. The relatively rare cases of gradual limitation of movement in elderly patients with senile osteoarthritic changes, and in younger patients with polyarthritis involving the temporomandibular joint, have not been considered.

*Adapted from Section Odontology, Proceedings of the Royal Society of Medicine, 44:363-371 (May) 1951.*

## ANNUAL INDEX-1951

### Anatomic Reconstruction

Ogus, William I.: Detaching of Condyles: Correction for Prognathism, October 452

### Anesthesia

Inhalation During Dental Extraction (An Abstract), January 16  
Sadov, Max S., and Gans, Benjamin J.: Anesthesia in Hospital Surgery (An Abstract), May 220  
Waldman, David, and Weisman, Theodore H.: Techniques for Relaxation and Hypnasthesia, October 444  
Willinger, Louis: Neurolene for Inhalation Anesthesia and Analgesia, January 17

### Caries

Finke, A. H., and Hildebrand, G. J.: Five Years of Fluoride Operations in Sheboygan, Wisconsin, November 502  
Rovelstad, Gordon H.: The Pediatrician's Responsibility in the Prevention of Dental Caries (An Abstract), September 426

### Clinical and Laboratory Suggestions

January 30  
February 76  
March 126  
April 174  
May 216  
June 270  
July 318  
August 364  
September 416  
October 458

November 508  
December 558

### Contra-Angles

January  
The Case of Mrs. H.; A Cordial Welcome; A New Look in Advertising; Speaking of Urine 40  
February  
The AMA Spends Another Half Million; The President is a Man; Have Fun While Your Teeth Decay 84  
March  
Think Twice and Then Three Times; The Bigger They are the Easier to Reach; The Romance of Philip Hench 134  
April  
Living with a Damaged Heart; What do you Mean, Normal?; The Newer Dental Pathology 182  
May  
The Myth of the Jolly Fat Man; Health: No Jewel so Precious 235  
June  
In Praise of Idleness 277  
July  
Dentists and Their Hobbies 325  
August  
Krebiozen; How's Business? 371  
September  
A Note on Ethics 422  
October  
Too Much "Doctor"; Friends and Hobbies; Prosthetics Perpetual 468  
November  
More on Dental Infection 515  
December  
Washington in October 567

### Dentures, Full and Partial

Berman, Nicholas: An Implant Technique for Full Lower Denture, October 438  
Breckner, Charles S., and Miller, I. Franklin: Traumatic Occlusion and Prosthetic Procedure (An Abstract), October 457  
Clark, Wilfred D.: Eight Points for the Improvement of the Full Lower Denture, September 404  
Collett, Henry A.: Principles of Partial Denture Design, January 24  
Fixed and Removable Bridgework (An Abstract), November 525  
Gillis, Robert R.: Registration of the Denture Space (An Abstract), January 36  
Malson, T. S.: Recording and Transferring Mandibular Movements, August 349  
Ogus, William I.: Research on Implantation of Metals, February 58  
Page, Harry L.: Centric and Hinge-Axis, March 115  
Page, Harry L.: The Bennett Movement, September 412  
Page, Harry L.: Maxillomandibular Terminal Relationships, November 490  
Silverman, Meyer M.: Accurate Measurement of Vertical Dimension by Phonetics and the Speaking Centric Space (Part One), June 261  
Silverman, Meyer M.: Accurate Measurement of Vertical Dimension by Phonetics and the Speaking Centric Space (Part Two), July 308  
Skinner, Perry R.: Intraosseous Im-  
(Continued on page 564)



## A Discussion of

# CANCER of the MOUTH

## Part II

JOSEPH E. SCHAEFER, D.D.S., M.D., and IRA TRESLEY, M.D., Chicago

### DIGEST

*In this, the second installment of a two-part article stressing the importance of cancer detection in the dental office, various types of oral cancerous lesions and the measures used for control are illustrated. A brief summary of the points discussed is included.*

### Early Treatment Method

In the original statement of the treatment of cancer the method consisted of early recognition with wide excision or complete destruction. If every cancer cell is destroyed the case

is controlled. Cancer always begins as a local disease which spreads by (1) direct extension, or (2) metastasis through the lymph channels.

*Figure 16—Cancer of the tongue.*

*Figure 17—A case in which half of the tongue was removed for cancer, followed by deep x-ray therapy and a neck resection.*

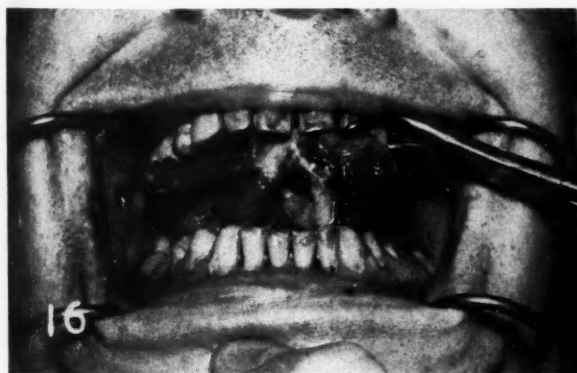
*Figure 18—Three cases of hemisection of the tongue.*

*Figure 19—A cancer of the maxillary sinus. This type of cancer, because it begins in the maxillary sinus where it cannot be seen, is usually not recognized until its advanced growth,*

by its expansive force, pushes the external and internal walls of the maxilla. The patient then presents himself with a swollen face and often with a complete blockage of the nasal passages on the affected side. Inspection of the interior of the nose reveals a boggy, edematous swelling of its outer wall. A biopsy demonstrates the presence of a squamous cell cancer. This case was treated (1) with a red hot soldering iron used intraorally, and (2) with extensive destruction of the maxilla on the affected side, followed by radium packs.

*Figures 20 and 21—The closure of the maxillary defect with a denture.*

*Figure 22—An impression showing the extent of the defect in the*

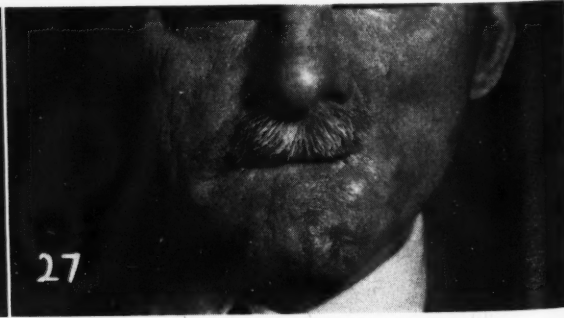
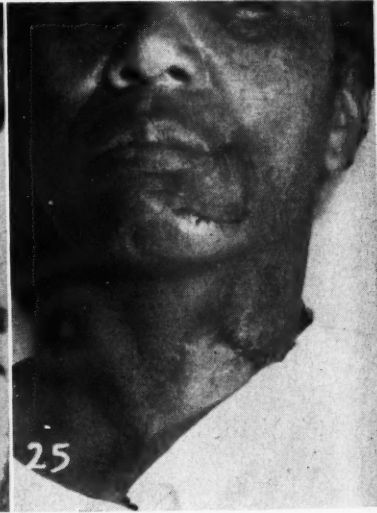
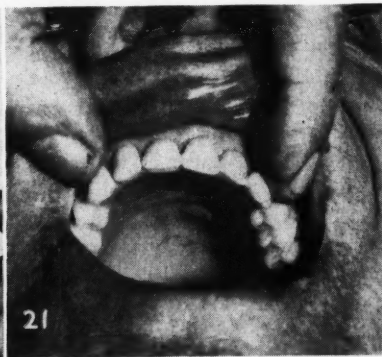




maxilla, extending into the maxillary sinus, the ethmoidal sinus, and the nasal cavity. This case has been controlled about three years.

*Figures 23, 24 and 25—Controlled cases of cancer of the lip, showing plastic repair by use of a pedicle flap.*

*Figures 26 and 27—A controlled cancer of the lip and cheek with a plastic repair made by transferring a triangular mass of tissue taken from the upper lip, filling in the lower lip defect.*





**Figure 28**—A controlled cancer of the buccal sulcus with extension into the mandible. Half of the mandible was removed, together with the lesion in the floor of the mouth. Surgery was followed by extensive radiation therapy.

**Figures 29 and 30**—Plastic repair of the cheek and floor of the mouth.

**Figures 31 and 32**—The use of prosthesis to replace the facial defect

following destruction procedures of a cancerous lesion of the maxillary sinus.

**Figures 33 and 34**—An extensive destructive lesion of a basal cell cancer of the face with restoration of the defect by a prosthetic appliance.

### Summary

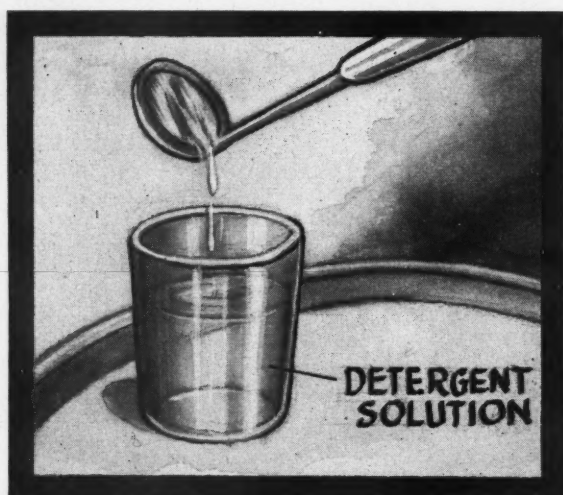
The dentist must be vigilant in his examination of all ulcerations of the mouth or lips. Cancer appearing in

the mouth is usually an ulcerative lesion. Any single ulcer in the mouth which cannot be explained on a traumatic basis and which does not heal in the usual time of one or two weeks at the most, as inflammatory lesions usually do, must be regarded as suspicious of cancer until proved otherwise.

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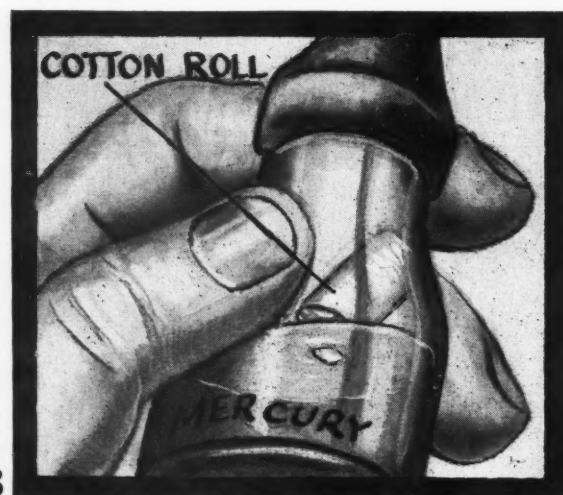




1



2



3

## Clinical and Laboratory

### Water-Spray Technique

Ford W. Stevens, D.D.S., Philadelphia

1. When using the water-spray technique the mouth mirror becomes wet and it is difficult to get an accurate image. If the mirror is dipped into one of the detergents (Dreft, for instance) from time to time when operating, it can be kept free from distortion.

### A Child's Seat in the Regular Dental Chair

R. B. Swindells, L.D.S., Leeds, England

2. A children's car seat may easily be adapted to the regulation dental chair as shown in the illustration. This is suitable for children up to the age of six.

### Removing Oxide From Mercury

Bernard A. Widen, D.D.S., Chicago

3. Place a cotton roll in the mercury container. Tighten the lid and rotate the mercury until it appears perfectly bright. Discard the cotton roll, or if desirable, leave the cotton in the container to absorb moisture and oxide.

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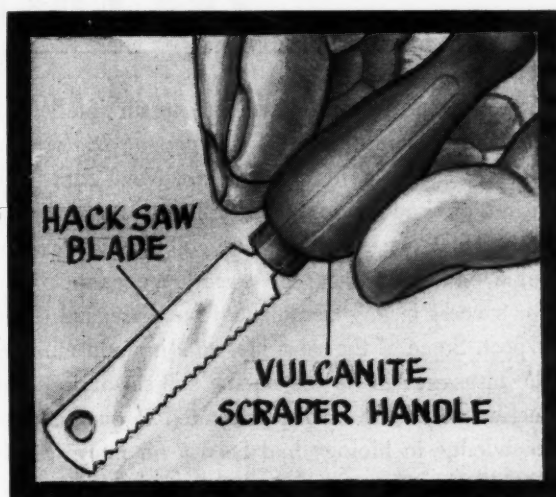
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

## to **SUGGESTIONS . . .**

### **An Instrument for the Separation of Teeth on Models**

Walter Spivack, D.D.S., Philadelphia

4. A section of a hacksaw blade is mounted in a vulcanite scraper handle to form a convenient instrument for separating or isolating teeth on plaster or stone models.

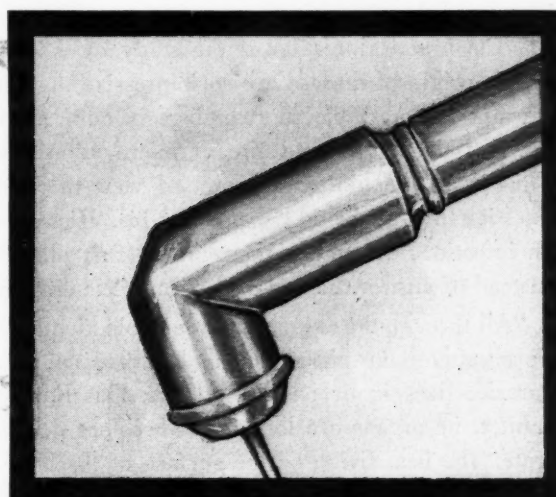


**4**

### **An Adjustment of Angle Handpiece Attachments**

J. L. Barber, D.M.D., Coronado, Calif.

5. Some types of angle handpieces may be made smaller and more convenient for use in areas of difficult operative access by removing the sharp corner as shown in the illustration.

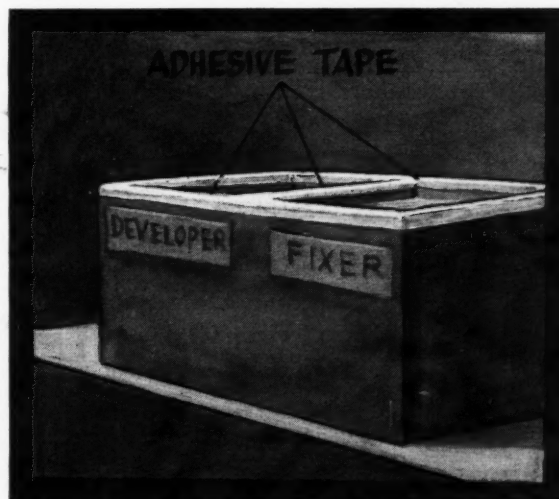


**5**

### **Improving Darkroom Visibility**

Nelson B. Hall, D.D.S., Kennebunk, Maine

6. Use ordinary white adhesive tape to outline the developer and fixer compartments in the x-ray processing tank. This procedure makes it easier to distinguish compartments when the light is turned off in the darkroom. When the tape is soiled it can be readily replaced.



**6**

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 562 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

## The EDITOR'S Page

ANY DENTIST who is interested in an intellectual adventure should read *A History of Biology* by Charles Singer (Henry Schuman, New York, publisher, revised edition, 1950). Most of the clinical issues that confront us are a combination of biologic and mechanical problems. We cannot hope for success in any treatment if we disregard either aspect. Some of the misunderstanding and much of the bitterness in debate on the subject of focal infection could have been prevented if our roots of knowledge in biology had been a bit more deeply placed.

As an example of deep thinking and clear expression, Singer writes on "Some Failures of the Theory of the Microbic Origin of Disease:"

"The practical results of the study of the microbic origin of disease are so impressive that we are apt to forget the shortcomings in our knowledge of the nature and life of micro-organisms. Thus from the biological point of view the first question that we should like answered is, 'How does an infectious disease originate in the first place?' Instead of answer there is almost complete silence.

"All through the animal and vegetable kingdoms we encounter the phenomenon of *parasitism*. The parasite lives in or on its hosts. In that limited habitat, its organs are lost and it becomes degenerate. The flea, living on the surface of the body, loses its wings. The mistletoe can no longer root in earth. Many parasitic plants have lost their chlorophyll. Intestinal parasites have lost their sense-organs, and among them are forms without digestive canal and even without power of movement. It is assumed that the bacteria are such degenerate organisms, though we are without knowledge of their ancestry.

"How does such a form become parasitic? We are entirely in the dark. We are struck with the fact that diseases often attack only one particular species but why the fowl, for example, alone suffers from fowl cholera, and man alone from typhoid fever, it is hard to say. Why should not allied forms be attacked by such diseases? We can but guess.

"A disease must have started at some time. Without raising the question of the origin of life itself,

it is evident that there must be points in history at which disease germs of each type enter a body for the first time, and cause a disease for the first time. We hear of historical or contemporary records of previously unknown diseases. But no one has ever watched the process of the first appearance of a disease from the bacteriological point of view. We have, therefore, no real knowledge as to whether any particular disease is new or not.

"Again, if a disease is traced through history, it is evident that its type changes. Scarlet fever, measles, influenza, are very different in one year from what they are in another. Why? Is it that the infective organism has changed or is it that the host has changed? We know nothing on these matters, and the answers that are given do but darken counsel with words.

"On these fundamental points our age is as ignorant as other ages were. So long as this is so, it is but blind optimism that can speak of 'the secret of disease' having been 'wrested from nature.' It is no small part of the function of science to define the limits of knowledge. Unjustified optimism is as much the enemy of science as is unreasoning credulity."

With the concept of the general adaptation syndrome to nonspecific stress we must be impressed that disease, all disease, is a matter of the degree and kind of stress plus the manner of response of the host. Bacteria represent one form of stress. They may attack in great numbers and with powerful virulence. If the defensive reserves are strong the disease will be prevented or overcome. This power of defense is thought to reside in the anterior pituitary-adrenal cortical mechanism. Bacteria of low virulence and of scant numbers striking an organism of depleted reserves will produce disease. We have been so preoccupied with the bacteriology of disease that we have ignored the biology of disease. We have so concentrated our attention on a part of the body that we have failed to observe that the organism as a whole responds to any stress. A dental disease or a dental procedure is more than a local event; the entire organism is involved.





## Bed Rest vs. Myocardial Infarction

There is no statistical evidence that bed rest, or even markedly restricted activity over a prolonged period, advantageously affects either the course or the later sequelae of myocardial infarction. Some clinicians maintain that routine prolonged bed rest in myocardial infarction is not only unnecessary but also potentially harmful to the mental and physical well-being of the patients.

Bed rest has long been regarded as the prime factor in the treatment of myocardial infarction. Periods of four weeks or more as a minimum are recommended. The advantages ascribed to bed rest are: (1) the avoidance of cerebral anoxia during shock, (2) prevention of sudden death, and (3) preservation of myocardial function. The first is an immediate protection to the patient whose circulatory collapse briefly necessitates a recumbent or head-down position.

There are many disadvantages of recumbency: (1) The circulation to the basilar part of the lungs is poor, (2) atelectasis, (3) hypostatic pneumonia, and (4) constipation are common. The development of phlebotrombosis and subsequent embolization is much higher. The exercise tolerance is decreased, requiring many weeks to return to normal.

The psychogenic sequelae are not to be disregarded: (1) Large numbers of patients who have had myocardial infarction have become pitifully inactive because of symptoms brought on by fear rather than heart disease. (2) In the increasingly older population the economic factors, even if the emotional ones could be disregarded, are serious enough to warrant further study.

In the treatment of myocardial infarction there are two main considerations: (1) The first is the immediate saving of the patient's life. (2) The second is to prepare the patient for further living. The latter has probably often been neglected in the earnest desire to accomplish the first.

Usually, along with prolonged bed

# M E D I C I N E

and the

Biologic

Sciences



rest, a rigid routine is demanded. In most cases this includes four weeks of absolute or nearly absolute bed rest followed by varying lengths of inactivity so that rarely is the patient without residual symptoms returned to normal activity in fewer than three weeks.

The practice of prolonged bed rest is still recommended by many physicians as they are reluctant to alter this concept in their patients' minds. An unfortunate incident or coincidence may damage the reputation of the physician.

In most cases it is believed that two weeks in bed, with reasonable, carefully explained restrictions, and possible bedside toilet privileges, would be all that is necessary. Even during this period some gradually increasing activity might be started. After this, in the absence of contradictory symptoms and signs, patients should be gradually and progressively allowed to walk until at the end of four weeks from the onset day they have regained some of their previous exercise tolerance and are prepared to leave the hospital on light activity.

There is no blanket recommenda-

tion applicable to all patients. Judgment is still needed to prescribe the correct treatment for the individual patient.

Warren, Irvin C. Jr., and Burgess, Alexander M., Jr.: *The Abuse of Bed Rest in the Treatment of Myocardial Infarction*, New England J. Med. 243:486-493 (September 28) 1950.



## Biopsy in the Oral Cavity

Lesions of the lip are not usually large or of long duration before the patient seeks the advice of his doctor. Biopsy of lesions of the lip is probably best done by small V excisions of the entire lesion and a margin of good tissue. The scalpel is the best instrument although electric cautery is also used. Subsequent suture of the lip should leave little scar and only slight difference in the size and shape of the lip. Close examination of the submental, submaxillary, and cervical regions in all suspicious lesions of the lip should not be neglected.

The electric cautery is probably best for biopsy of lesions of the buccal mucosa and tongue. These areas, particularly the tongue, are vascular areas. Hemorrhage is better controlled by use of cautery and coagulator.

If possible, the lesion of the buccal mucosa or tongue should be removed entirely with a margin of good tissue. Large defects will take a while to heal. Suturing may be attempted but the sutures will usually slough out before healing occurs. It is probably a better practice to coagulate all bleeding points after the biopsy has been taken, suture as well as possible, and allow the remaining part to heal by granulation.

Small lesions of the buccal mucosa may be excised and sutured. Likewise lesions of the anterior portion of the tongue may be excised with a comfortable margin and the defect sutured.

In case the biopsy is positive for cancer it is wise to protect the patient by treatment with radium or radon

## CLINICAL AND LABORATORY SUGGESTIONS

(See pages 558 and 559)

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seeds even though the surgeon feels that he has removed enough tissue.

Jordan, Edward J., and Keyes, C. Lawrence: *Early Diagnosis of Cancer. The Biopsy*, J. Missouri M. A. 48: 97-99 (February) 1951.



### Epilepsy—General Considerations

Epilepsy can occur at any age. It masquerades in many forms so that many persons do not realize they are afflicted with epilepsy. The condition is an irritative reaction to brain injury.

It does not occur as a result of those severe brain injuries which destroy the nerve cells of the brain. Usually it is a result of minor injuries which produce physiologic rather than histologic changes. A zone of mild injury may occur around an area of severe injury, so that epilepsy may occur in association with severe injury, as for example, in cerebral palsy. The physiologic, intermediate (nonstructural) injuries which cause epilepsy can be produced in many ways: (1) trauma, (2) injections, (3) disorders of cerebral blood supply, and (4) tumors.

In the United States there are over a million persons with epilepsy. The advances of the past ten years have made it as treatable as diabetes. As in diabetes, the patient must be kept for long periods on maintenance medication.

The antiepileptic drugs which a patient takes should be viewed as substitution therapy, because they are necessary substitutes for chemical configurations which his injured brain does not produce. Most of the antiepileptic drugs are potentially dangerous. Close medical supervision, therefore, is essential.

Heredity is not as important a factor in epilepsy as was once supposed: 1. In general, the chance that an epileptic will have an epileptic child is only one in fifty. 2. The chance that a person with epilepsy will have a near relative with epilepsy is only one in fifty. 3. The chance that anyone

will have epilepsy is about one in one hundred.

The condition can be called a "tumor of function," for it is associated with a gigantism of energy release within the nervous system. The seizure is an explosion in which normal spatial and temporal barriers are disregarded.

Under the microscope, the epileptic brain commonly appears normal. When looked at with the electroencephalograph, particularly during sleep, it appears extremely abnormal. The electroencephalograph reveals explosive electrical discharges and shows that they occur not only at the time of clinical seizures but also between seizures.

Between seizures discharges, or sub-clinical discharges as they are called, are many times more numerous than those associated with clinical seizures. This evidence is reliable and indicates a failure of the normal temporal and spatial regulation of energy release within the central nervous system, a failure which is as real as the failure of growth regulation in cancer.

The medical treatment of epilepsy is directed at damping down the electrochemical explosions in the brain. Different types of drugs must be used for different types of discharges. The interested internist or general practitioner can treat epilepsy as well, and possibly better, than anyone else, for the modern treatment of epilepsy requires blood counts and liver tolerance tests to guard against special sensitivities.

Gibbs, Frederic A.: *The Treatment of Epilepsy*, J. Michigan M. Soc. 50: 145-148 (February) 1951.



### Effects of Semistarvation

Frequently, persons who conscientiously follow a weight reduction diet reach a point approximating starvation. To learn more about the effects of such diets a long term experiment was conducted at the University of Minnesota, the Laboratory of Physiologic Hygiene on 32 conscientious ob-

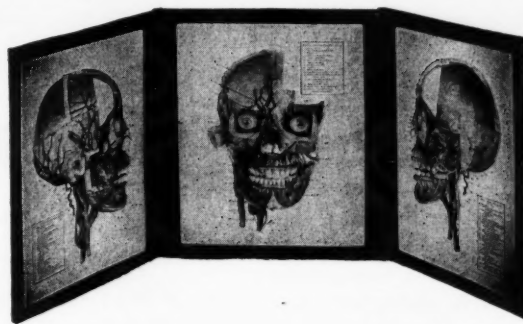
jectors. The tests were well controlled as the objectors were residents at the laboratory for a year.

For three months the volunteers were subjected to studies of metabolism. Then, they underwent a six-month period of semistarvation. Following this they were studied for three months during rehabilitation.

During the first period, body requirements were maintained on 3,492 calories per day. There were adequate amounts of protein, vitamins, and minerals without excessive amounts of

any special nutrient substance. The semistarvation diet produced 1,570 calories daily. This diet included potatoes, cabbage, turnips, and cereals with only a few grams of animal protein a week. This diet resembled the amount used in famine in northern Europe.

At the end of the six-month period there was a 24 per cent loss in body weight. The symptoms of famine including (1) swelling from accumulation of water in the tissues, (2) anemia, (3) slow heart beat, (4) weak-



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ness, and (5) depression were noted in all of the volunteers.

Investigators were able to determine the manner in which the body adjusts itself to famine. The starving body must use some of its own protein for fuel. The brain tissue loses a smaller fraction of its usual weight during a period of severe starvation whereas fat, muscle, liver, and skin in the body undergo large losses. The heart also undergoes a considerable loss of muscle mass during acute and chronic starvation. However, the body makes adaptations which safeguard the heart. The work done by the heart decreases about 50 per cent as a result of starvation.

The changes in the body enable it to meet the new situation more effectively than would otherwise be the case. The adaptations that occur in stressful situations are generally compromises. The changes due to semistarvation permit man to meet the altered situation with moderate success. Rigid dieting over brief periods of time cannot do serious harm to the human body because of the factors of safety that lie within the body itself.

*Editorial: Human Adaptation to Semistarvation, Postgrad. Med. 8: 423-424 (November) 1950.*

## Annual Index

(Continued from page 554)

plant for Stabilization and Retention of Upper Dentures, May	202
Sloane, Robert B.: One Component of Mandibular Function, April	154
Snodgrass, Richard M.: Toward Measurement of the Face in Time and Space, October	447

## Editorials

Biologic Values in Dental Practice, January	32
Fractures of the Facial Bones, February	78
Frictional Heat in Operative Dentistry, March	128
Headache, April	176
Common Aims of Medicine and Dentistry, May	215
Oral Infection, June	272
Surgery of the Hard Dental Tissues, July	317
Adaptation of Tungsten Carbide to Dental Burs, August	366
Focal Infection, September	415
Fainting, October	460
State of Present-Day Knowledge of Malignant Disease, November	510
The Microbic Theory of Disease, December	

## Medical Subjects

Activity of Salivary Glands (An Abstract), November	507
---	-----

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Blank, Harvey, and Brody, Morris W.: Recurrent Herpes Simplex (An Abstract), October	476
Blood Sedimentation Rate (An Abstract), March	125
Cancer Focus (An Abstract), September	429
Danger of Poisoning From Mercury Vapor, February	63
De Bre', Alvin J.: A Clinical Report of 100 Cases Using Bantline® as an Antisialogogue in Dental Procedures, May	210
Focal Infection and Acne (An Abstract), December	548
Hollander, Lester, and Kennedy, R. M.: Dermatitis Caused by Autopolymerizing Acrylic Restoration Material, May	213
Insensitivity to Pain (An Abstract),	

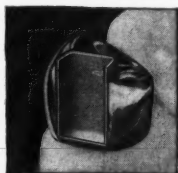
July	327
Milk for Control of Vomiting Caused by Aureomycin (An Abstract), February	63
Swelling of the Cheek (An Abstract), April	187
Thrush in Infants (An Abstract), July	328
Treatment of the Common Cold (An Abstract), March	125

## Medicine and the Biologic Sciences

January	
Migraine Headache; Breast Feeding; Gold Therapy for Rheumatoid Arthritis; Procaine; Diabetes—Basic Considerations; Increase of Tuberculosis	33
February	
Insurance Aspects of Heart Disease;	

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Liver Function in Heart Failure; Importance of Potassium; Burns in Atomic Warfare; Sunlight vs. Skin Carcinoma	81	Pernicious Anemia; Penicillin in Patients with Congenital Heart Disease; Common Cold—Problems; Psychiatry in Geriatrics	222
March		June	
Alcoholism—Etiology; ACTH in Rheumatic Fever; Early Immunization; Stuttering; Diet in Tuberculosis; Uses of Thyroid Substance; Musculoskeletal Diseases in the Aged	129	Acne—Treatment Considerations; Infections from Syringes; Diabetes and Visual Complications; Chickenpox	269
April		July	
Vitamin K; Psychosomatic Aspects of Gynecology; Hay Fever; Eating Habits of Children; Pregnancy Following Mastectomy; Colostomy	177	The Health of the Young Executive; Gout; Vitamin Absorption with the New Antibiotics; Treatment of Poliomyelitis; Lipid Pneumonia from Oil	320
May		August	
Administration of Aureomycin; Scalp Massage and Partial Baldness; Procaine in Rheumatic Diseases; Climate and Hemorrhage; Characteristics of		Weight Loss in Obesity; Healing of Fractures; Rejuvenation in Geriatrics; Hemophilia—General Considerations; Television vs. Eye Strain; Diet in Essential Hypertension; Hor-	

mones and Cancer	367
September	
Advice Following Thrombophlebitis; Chlorophyll as a Deodorant; Electroencephalography; Aureomycin in Tooth Extraction; Headache of Ocular Origin	418
October	
Treatment of Burns with ACTH; Streptomycin Hypersensitivity; Lung Cancer—Incidence; The Syphilis Problem—Present Status; Postpartum Plasma in Rheumatoid Arthritis; Poliomyelitis vs. Immunization; Obesity	461
November	
Alopecia; Amebiasis—Management Present-Day; Premenstrual Tension; Acute Otitis Media; Cosmetic Dermatitis; Section of the Trigeminal Nerve; Needle Biopsy	511
December	
Bed Rest vs. Myocardial Infarction; Biopsy in the Oral Cavity; Epilepsy—General Considerations; Effects of Semistarvation	561

## Miscellaneous

Album, Manuel M.: Dental Techniques and Treatment in Cerebral Palsy, February	64
Announcement of Books Received, July	304
Annual Index, December	
Cathcart, Jack F.: Mouth Protectors for Contact Sports, August	346
Familial Fibrous Swelling of the Jaws (An Abstract), August	381
Fluorescence of the Tongue (An Abstract), October	473
Latest Thoughts in Medicine, February	140
McDonald, John R., and Alcott, Donald L.: Tumors of the Head and Neck, August	358
Moss, Aaron: Dental Treatment of the Cerebral Palsied Child, December	
Risser, Joseph C.: Relaxing Exercises for the Dentist, June	254
Susman, H. S.: Mental Dentistry, February	73
Teething Troubles (An Abstract), March	114
The Rest Position of the Mandible (An Abstract), January	23
Wainwright, William Ward: Dentistry and the Atomic Energy Program (An Abstract), February	72
With Pen in Hand, February	132

## Operative Dentistry

Bodecker, Charles F.: Enamel Etching Under Orthodontic Bands, (An Abstract), July	332
Coltune, Jerome W.: Ortho-Prosthodontic Approach to Mouth Rehabilitation, December	538
Forde, Thomas H.: Oral Dynamics (Part One), January	10
Forde, Thomas H.: Oral Dynamics (Part Two), February	68
Forde, Thomas H.: Oral Dynamics (Part Three), March	118
Forde, Thomas H.: Oral Dynamics (Part Four), April	165
Holtzendorff, L. C.: The Correction of Traumatic Occlusion by Articulator Analysis, January	20
Humphrey, William P.: A Direct Method for Making and Soldering a Space Retainer, May	214
Kilpatrick, Harold C.: Elimination of Factors Affecting the Finish of Amalgam Restorations, September	401
Malson, T. S.: The Shell Crown—An Anatomic Reproduction, July	312
Rosenstiel, Edwin: Electroforming Dental Dies, September	394

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Wheeler, Russell C.: Extension for Prevention vs. Conservation for Use, July 298

## Oral Pathology

Aphthous Stomatitis (An Abstract), November 504  
Aureomycin and Bacteremia in Tooth Extraction (An Abstract), March 137  
Canker Sores (An Abstract), September 414  
Dryness of the Mouth (An Abstract), April 189  
Goldstein, Milton: Aplastic Anemia Initially Observed in Dentist's Office, October 456  
Ireland, V. E.: Problem of the Clicking Jaw (An Abstract), December

Labial Diphtheria (An Abstract), February 88  
Linghorne, W. J., and Stedman, D. F.: A New Treatment for Vincent's Infection (An Abstract), June 281  
Oral Cancer (An Abstract), February 79  
Schaefer, Joseph E., and Tresley, Ira: Discussion of Cancer of the Mouth, Part One, November 496  
Schaefer, Joseph E., and Tresley, Ira: Discussion of Cancer of the Mouth, Part Two December 400  
Severe Dryness of the Mouth (An Abstract), September 400  
Slocumb, Charles H.; Binger, Melvin W.; Barnes, Arlie R.; and Williams, Henry L.: Focal Infection (An Abstract), October 443

Smith, Rowe: Oxygen Therapy (An Abstract), October 451  
Wilkins, Esther M.: A Study of Oral Calculus (An Abstract), May 227

## Oral Surgery

Abscessed Teeth (An Abstract), September 428  
Dental Aid (An Abstract), April 158  
Feldman, M. Hillel: Simplifying a Difficult Operation for Removal of a Mandibular Third Molar Impaction, May 212  
Feldman, M. Hillel: Removal of the Hypercementosed Mandibular Bicuspid, September 410  
Lozier, Matthew: Postoperative Management of Bone Cavities in Exodontia and Oral Surgery, September 408  
Lyons, Don Chalmers: Acute Tuberculosis as a Complication to Extraction of Teeth, May 208  
Murphy, David L.; Murphy Edward S.; and McNichols, William A.: Complicated Fractures of the Maxilla (An Abstract), April 158  
Ogus, William I.: Electrosurgery for Elevation of Frenum to Aid Orthodontic Treatment, November 494  
Paskow, Herbert: Orthodontic Extractions, August 355  
Richards, H. G.: Respiratory Obstruction From Fractures of the Jaw, May 218  
Schaefer, Joseph E., and Rudder, R. C.: Accident in an Attempted Extraction of Upper Third Molar, March 113  
Smashed Faces (An Abstract), September 411  
The Evolution of Oral Surgery (An Abstract), June 285  
Wickstrom, Otto W., and Huebsch, R. W.: Repair of a Mandibular Bone Defect with Bone Chips (An Abstract), July 316

## Orthodontics

Massler, Maury, and Frankel, John M.: Prevalence of Malocclusion in Children (An Abstract), November 493

## Periodontics

Adelman, Arthur B.: A Back Action Appliance for Tooth Movement and Retention in Periodontics, November 505  
Boyens, Paul J.: Pathologic Drifting: Treatments for Spontaneous Regulation, April 159  
Orban, Balint J.: Biologic Principles in Periodontics (Part One), June 250  
Orban, Balint J.: Biologic Principles in Periodontics (Part Two), July 305  
Orban, Balint J.: Biologic Principles in Periodontics (Part Three), August 359

## Roentgenography

Leukemia in Radiologists (An Abstract), July 311  
McCormack, Donald W.: Intraoral Roentgenology, March 106  
Miller, Robert G.: Gross Radiographic Survey on Three Negatives, June 266





# Contra-Angles



## Washington in October

The use of CBS color television to demonstrate dental procedures was the outstanding feature of the American Dental Association October meeting in Washington. The operations were performed in the general surgery of the Mount Alto Veterans Administration hospital and carried over a closed TV circuit to the viewing screens at the Armory seven or eight miles away. Every aspect of clinical dentistry was demonstrated. The planning of this program under the direction of Dean Lester W. Burket of the University of Pennsylvania was superb and precise. The technical details handled by CBS and Remington-Rand, Inc. were perfect in execution. The costs for this pioneering project in dental education were met by E. R. Squibb and Sons.

Another outstanding feature of the meeting was the excellent public information program developed by Mr. Herbert B. Bain of the ADA central office. Reporters for both the general and the dental press were supplied with accurate abstracts of the papers presented before the sessions. A few newsworthy items prepared from these releases include:

## Direct Resinous Materials

Resins or synthetic plastics for dental restorations, described as more durable and more natural appearing than the ordinary cement or silicate materials commonly in use, were first developed during World War II by German dentists who had been forced to find substitutes for widely used gold restorations.

The combined report of Doctors Herbert D. Coy, David M. Bear, and Seymour J. Kreshover, all of the School of Dentistry, Medical College

## In your ORAL HYGIENE this month

### You're Asking for Trouble

There are two ways of solving problems—one is to foresee and forestall them . . . the other is to do the best you can with them *after* they've become a reality. The first is by far the easier course in the long run . . . Doctor Maurice J. Teitelbaum analyzes ten problems that frequently threaten the practicing dentist—and gives excellent advice on how to solve them while they're still in the future.

★ ★ ★

Want to jog some of your good intentions into actual accomplishment? Then read "Dentistry Within Limits." Ask yourself the questions in the first paragraph: "How long has it been since I tried a new medication, added a recently introduced piece of operating equipment, revised my working procedure, or arranged for a 'dress up' touch for the reception room?" You might add some others: "How long has it been since I attended a dental clinic or read a serious technical discussion of some phase of dental science or practice?"

The answers may surprise you—and perhaps urge some of those half-formed good resolutions into definite determination.

★ ★ ★

"Cowboy Style Dentistry" illustrates a most unusual way of keeping the small fry happy before, during, and after dental appointments, Bar D. K. (decay) Ranch is the inspiration of



two California dentists who have many child patients. Whether or not you want to turn your office into a piece of the wild-wild west, you'll enjoy this picture story of a most unusual departure from routine practice.

★ ★ ★

Here's more information to file in your "life insurance" folder. W. Clifford Klenk describes five types of policy and the advantages and disadvantages of each in his article, "What To Do With Your Surplus."

★ ★ ★

And while you're thinking of finances, here are "Ideas for Income Tax Savings"—just in time to help you with your end-of-the-year records. Perhaps some of the information may save you actual money when March 15 rolls around.

★ ★ ★

Then there are, of course, all of the regular features and departments . . . and the Annual Index. It's interesting to glance through this index, noting how many different *kinds* of articles Oral Hygiene has published during the past year—all with just one idea: to help or interest you.

of Virginia, included the following points:

Those who have worked with the direct resinous restoration materials during the short time that they have been available conclude that they meet the requirements of a satisfactory restorative material.

A study was made of 300 patients with an average of two restorations each. Fifty patients were recalled for observation in three months and 40 others in a year. In 105 restorations there had been only five pulp "deaths" and in these cases the teeth that were restored had been the seat of deep carious lesions. A new method was employed in restoring such carious teeth and no pulp deaths occurred since this procedure was instituted. The plastic restorations had no apparent tendency toward solubility in the fluids of the mouth; in this respect they had great superiority over silicate cements.

Additional reports on the new material were made by Doctor George C. Paffenbarger of Washington, D. C., chief of the American Dental Association's research staff assigned to the Bureau of Standards, whose opinion was that the material was more durable than others now in use, and that it did not dissolve or discolor; and by Doctor Alexander Seelig, instructor in the School of Dental and Oral Surgery, Columbia University, New York, who concluded that pulpal irritation encountered in the use of direct resinous materials is primarily due to other factors than the plastic.

### **Acute Odontogenic Infections**

Doctor Edward L. Sleeper, assistant professor of oral surgery at Tufts College Dental School, Boston, stated that many anterior teeth which are infected can be saved by treatment with penicillin or aureomycin. Many anterior teeth, in younger patients especially, have been so loose when acutely involved that they could have been extracted with the fingers; when the infection was under control with use of antibiotics and drainage, if necessary, the patient had a functional tooth.



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Doctor Sleeper stated that the antibiotic drugs have removed much of the danger of extraction in the presence of swelling or acute infection. Teeth involved in an acute infection, however, should not be removed if the procedure would require more than simple forceps extraction. The response of the patient is the most reliable guide to the efficacy of treatment and if extraction in acute infections cures a patient sooner and eliminates days of discomfort that is what should be done.

Heat will make an abscess break

sooner but it is not the determining factor in the spread of infection. The course of an infection is determined by the anatomic boundaries of the area and neither heat nor cold will divert it to another direction.

### **Partial Denture and Its Relation to Periodontia**

Most people grind their teeth while sleeping but measures can be taken to correct this habit which chips and loosens the teeth and causes erosion and sensitiveness of the tissue. Doctor Arthur F. Schopper, special lecturer,

Ridge Lap area of average plastic tooth = 45.6 sq. mm. of contact area with denture material.

Cylindrical wall area of retention hole in "S-R" tooth = 15.5 sq. mm. of contact area.

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Kansas City University School of Dentistry, recommended an appliance known as the Hawley retainer originally devised to keep the dental arch in place after correction of tooth irregularities. The use of this appliance has preserved teeth for many years and can be used by all persons except those who have an open bite and are unable to occlude their upper and lower anterior teeth. For these the use of bite blocks in the posterior teeth was recommended to prevent grinding at night.

### Practical Use of Space Maintenance

Doctor James J. Kennedy, assistant professor of children's dentistry at Northwestern University Dental School expressed the opinion that a child's deciduous upper anterior teeth can be lost prematurely with less serious results than any other primary teeth.

Early loss of the first molars is slightly more serious, while premature loss of the second primary molars is the most disastrous of all early

tooth losses. If some teeth lost prematurely are not replaced by space maintainers, the permanent teeth may be forced out of alignment.

Upper anterior teeth lost prematurely need not be replaced by space maintainers except for purposes of appearance or to prevent the possibility of a speech defect. In Doctor Kennedy's opinion, however, if a primary molar is lost prematurely and the permanent tooth has not erupted, it should be replaced by an appliance. Doctor Kennedy stressed the importance in a space maintainer of adequate function, simplicity in construction, and ease in wearing for the child.

### Trauma: Its Effect on the Edentulous Ridge

Doctor Thomas M. Meloy, Jr., associate professor of dental surgery, School of Dentistry, University of Pennsylvania, Philadelphia, suggested that while the dentist may use all the scientific knowledge available to construct as near a perfect functioning restoration as possible, he still cannot control certain changes that occur in the denture-supporting tissues.

In these cases the tissue itself may be to blame. With some patients the proper use of their dentures in masticating food will stimulate the supporting tissues sufficiently to prevent rapid loss in the extent of the ridge. In others the ridges may undergo a rapid disintegration. Changes in the ridges of many patients may fall between these two extremes.

The importance was emphasized of impressing patients with the need for returning to their dentists at regular intervals for inspection and correction of dentures.

### Radioactive Metals for Dental Investigations

Atomic energy can aid dental science to determine the hardness and durability of metals and their desirability as restoration materials. Doctor William Ward Wainwright of the University of Illinois College of Dentistry, formerly of the Los Alamos, N.M., Scientific Laboratory stated that because of their radioactive property these metals can be traced and detected in much smaller quantities



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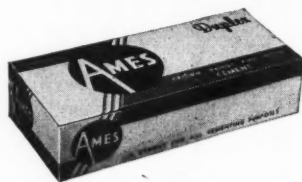
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than by chemical or microscopic analysis.

The heavy metals are the elements which are most readily rendered radioactive by nuclear bombardment. Shortcomings of restoration materials, such as metallic color, tarnishing and corrosion, should be studied with the aid of radioactive metals.

Nearly every metal used in dentistry is available in radioactive form to qualified investigators. The most widely used metals are obtainable from the U.S. Atomic Energy Commission, Isotopes Division, Oak Ridge, Tennessee. Gold, silver, copper, zinc, mercury, tin, iron, nickel, cobalt, and chromium are only a few.

Doctor Wainwright suggested that a typical opportunity for the use of radioactive metals is to study the behavior of the small amounts of mercury which are believed to be released from amalgam restorations and to cause staining of teeth.

### Preparing and Maintaining Oral Tissues for Complete Dentures

Doctor Russell W. Tench of York, Pennsylvania pointed out that elderly persons frequently suffer from the accumulated effects of many years of unrecognized starvation for small quantities of types of food necessary for cell growth. Not only do these people complain about their dentures but they may be psychologically disturbed, lackadaisical, suspicious, irritable, exacting and demanding, or possessed of phobias. The color of their mouth tissues is far from normal and the mucous membrane is tender or hypersensitive to pressure.

The presence of malnutrition and physical and mental unfitness in persons over sixty years of age, in Doctor Tench's opinion, indicates that they have been suffering before they were sixty from some form of malnutrition not usually recognized. In many cases the correction of malnourishment eliminated complaints about dentures.

The importance of chewing capacity in dentures was not underestimated by Doctor Muller M. DeVan, professor and chairman of prosthetic department, University of Pennsyl-

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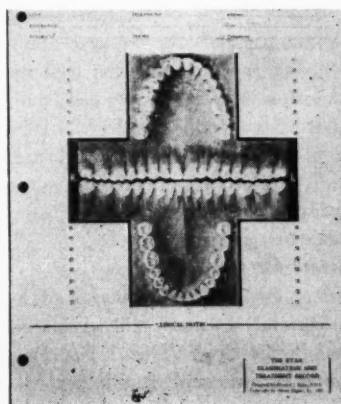
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vania School of Dentistry, Philadelphia, who pointed out that in many instances, however, it may be inadvisable to cater to this capacity at the expense of appearance and speech. By careful selection and preparation of his food the patient may cope successfully with the problem of reduced chewing powers, whereas he can do little or nothing to alter his appearance and to improve his ability to speak well. His social status may require of dentures the maximum in esthetics and speech, perhaps at the expense of chewing capacity.

## Effects of Premature Loss of Primary Teeth and Sequence of Eruption of Permanent Teeth on Malocclusion

The results of a study of 400 children examined and treated over a period of fourteen years were reported by Doctor Sidney M. Kronfeld, assistant professor of pedodontics, New York University College of Dentistry, who showed that the average intervals from the time primary teeth were shed until permanent teeth erupted was four months in 70 per cent of the total number of teeth examined. Doctor Kronfeld's study revealed that the longer the interval between the shedding of a primary tooth and the eruption of the permanent tooth, the greater the likelihood will be that the second tooth may not erupt in its correct position. The order of eruption of the permanent cuspids and bicuspids has little or no influence on the development of malocclusion but all prematurely lost primary cuspids and molars should be replaced by space maintainers immediately.

## Effective Utilization of Dental Assistants

That the effective use of dental assistants would permit dentists to increase dental care services from 33 to 75 per cent was suggested by Doctor George E. Waterman of Richmond, Indiana, senior dental surgeon, U.S. Public Health Service. This conclusion was reached in the study, under way since December, 1946, which is being made at a clinic where dental treatment is provided annually for

5,500 children from kindergarten through junior high school age.

Dentists at the clinic are aided by trained assistants who prepare patients for treatment, have ready the proper instruments, mix restoration materials, and are otherwise helpful. Quality of service is improved because the dentist is under less physical and mental strain.

### **The Askov Demonstration**

A ten-year study is being made at Askov, Minnesota to obtain information about the organization, procedures, and benefits of a community dental health program. Doctor William A. Jordon, director of the Minnesota Department of Health, Division of Dental Health, reported that during the time the program has been in progress, less than three years, the percentage of caries reduction has ranged from 41.6 per cent in the three-to-five age group to 8.4 per cent in the thirteen-to-seventeen age group.

The program covers 350 pupils in the Askov school district which includes a large rural area. Hinckley, Minnesota, a nearby community, was selected to serve as a control in the studies. Biennial examinations showed that Hinckley children had a lower caries rate than Askov children when the program started. A diet survey revealed that Askov children were eating meals high in pastries and other sweets; the diets of Hinckley children were considerably better. An educational program to improve nutrition was started.

At the beginning of each school term a complete dental examination, including x-rays, is given to all Askov children and all receive toothbrushes and tooth powder. Teachers and pupils are instructed in a proper method of brushing the teeth, emphasizing the value of immediate brushing after meals. Two tooth-brushing drills are held daily in grade schools.

Askov has no community water supply and cannot benefit by water fluoridation. At the beginning of the program, however, all children received topical application of fluoride, and those in age groups three, seven, ten, and thirteen years received it each year. Children wishing dental

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care may receive it. A modern dental office with a staff of three dentists is maintained in the school.

During the first two years of the program the majority of dental procedure was dental correction. These needs are now greatly reduced. Doctor Jordon reported that the cost of the Askov program had dropped from \$15,586.48 in 1949 to \$6,927.58 this year.

### **Application of Electromyography to Dental Research**

Doctor Samuel Pruzansky of Chicago, special research fellow of the United States Public Health Service, National Institute of Dental Research, reported the outcome of his experi-

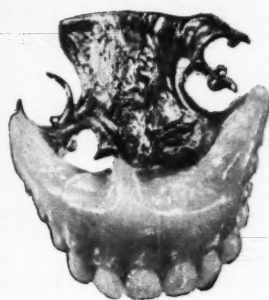
ments with electromyographic equipment which records tracings of electric currents created by muscular action and gives promise of being valuable in dental research and in prescribing exercises for the rehabilitation of polio and cerebral palsy victims.

Research was directed toward mapping patterns of electric response of facial muscles, including those used in chewing in both normal and diseased persons. The findings are similar to those reported for muscles of the legs and arms to which most past research with the electromyograph has been confined.

Equipment used in Doctor Pruzansky's studies included electrodes which pick up and transmit the electrical impulse from the muscle, an



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amplifier to magnify the voltages received, and a recording device.

Chewing movements may characterize persons as "grinders" or "choppers." A "grinder" can move his lower jaw from side to side as well as up and down when chewing while a "chopper" cannot. Differences were noted in the electromyographic patterns of the "grinder" and the "chopper" while they were chewing gum. These differences may enable the dentist to discover more of the factors governing masticatory efficiency.

An electromyographic examination was made of a fourteen-year-old boy who had suffered an acute attack of poliomyelitis four years earlier and was left with impaired chewing muscles on the right side. On the basis

of this examination Doctor Pruzansky prescribed jaw exercises for the boy to maintain the functional health of partly paralyzed muscles and to reinforce stimuli to partially affected nerve cells.

Electromyographic studies also included patients with brain tumor, Parkinson's disease, and severe muscular fatigue which, according to Doctor Pruzansky, prevented one man from chewing long enough to finish a meal.

Although a few members of the ADA are heard to raise their voices in protest to the centralization of affairs in the Chicago office and to the slight increase in dues, most members of the association are proud that

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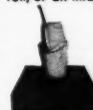
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we are "growing up." Our meetings, like everything else, now cost more. We are also getting more for our money. All the activities of the meeting show meticulous organization and long-time planning.

Some of us find ourselves in occasional disagreement with some of the actions taken by the House of Delegates, but even in our disagreement we are prompt to report that the deliberations of the House are carried on with decorum and parliamentary exactitude. A few of the papers presented before the sessions sound as if they might have been written the day before. An occasional table clinic may have a bit too much of the side-show barker. There are some scientific exhibits that seemed to be more concerned with aggrandizing an institution or a person than with imparting important dental knowledge. These carpings are, however, all in a minor key. The Washington ADA meeting was a model of skillful planning and exact performance. Too bad that Washington generally isn't like that!

—E. J. R.

See second cover

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THE S. S. WHITE DENTAL MFG. CO.  
211 S. 12TH ST., PHILADELPHIA 5, PA.

Please send information concerning your  
products.

Dr. ....

Address .....

City .....

See page 534

D.D.12

CHAS. PFIZER & CO., INC.  
BROOKLYN 6, N.Y.

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Dr. ....

Address .....

City .....

See page 536

D.D.12

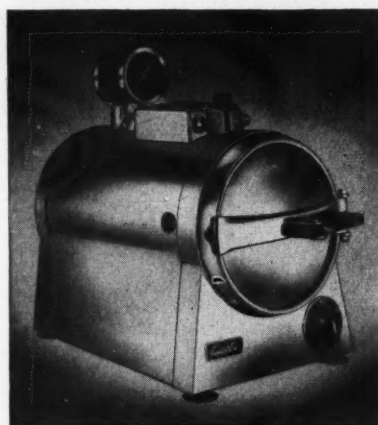
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# "777"

## SPEED-CLAVE

(Pressure Steam)

**High Speed—  
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Here at last is the autoclave for every office—the Castle "777" Speed-Clave. It's faster than boiling, easier than boiling, safer than boiling, and cheaper than boiling. The security of 100% sterilization—which only an autoclave can give—now becomes practicable for every office in this compact, fast, inexpensive, automatic autoclave.

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Gloves and Rubber Materials  
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## Castle LIGHTS and STERILIZERS

See pages 564-65  
THE J. M. NEY CO.  
HARTFORD 1, CONN.

D.D.12

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City .....

See page 566  
TICONIUM

D.D.12

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Please send name of the Ticonium Lab-  
oratory nearest to me.

Dr. ....

Address .....

City .....

See page 568-69

D.D.12

H. D. JUSTI & SON, INC.  
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products.

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City .....

See page 570

D.D.12

THE HYGIENIC DENTAL MFG. CO.  
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Please send information concerning Hy-  
gienic products.

Dr. ....

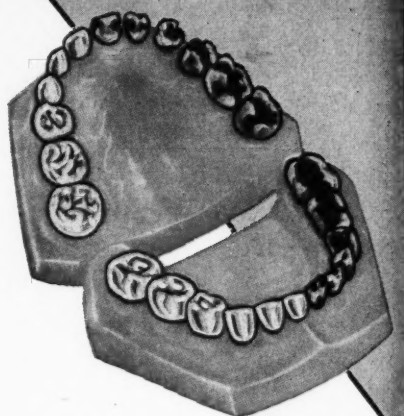
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Crowns, 30c apiece. Introductory assortment of 100 in permanent plastic box, 30.00. Box alone, \$1.50. Space Maintainers, 75c dozen (6 sizes).

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**TRU CHROME**  
**ROCKY MOUNTAIN METAL PRODUCTS CO.**  
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See page 570

YOUNG DENTAL MFG. CO.  
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Without any obligation send us one of your BS POLISHERS—ABSOLUTELY FREE.

Dr. \_\_\_\_\_  
Address \_\_\_\_\_  
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See page 570

THE W. V-B AMES CO.  
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Please send information concerning Ames Cements.

Dr. \_\_\_\_\_  
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City \_\_\_\_\_

D.D.12

See page 571

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NEW YORK 18, N.Y.

Please send SAMPLE Stick of KWIK-SEAL.

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City \_\_\_\_\_

D.D.12

See pages 572-73

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Dr. \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_

D.D.12

See page 573

HARRY J. BOSWORTH CO.  
216 W. JACKSON BLVD., CHICAGO 6, ILL.

Will welcome information concerning your products.

Dr. \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_

See page 574

WILMOT CASTLE CO.  
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Dr. \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_

See page 575

ROCKY MOUNTAIN METAL PRODUCTS CO.  
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See page 576

LUXENE, INC.  
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Dr. \_\_\_\_\_  
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See third cover

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THE DENTISTS' SUPPLY CO.  
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Dr. \_\_\_\_\_  
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your professional skill, knowledge and experience are the first essentials for satisfactory dentures for your patients. But, to be SURE, as sure as you can be, that your work will not be spoiled by denture breakage, prescribe Luxene 44 for your cases. You see, Luxene 44 is a Vinylite\* plastic, 2 to 3 times stronger and tougher than acrylic plastic. You can use it even for delicate partials. And chances are that in full cases, your experience with Luxene 44 will be the same as so many dentists who have had no breakage whatever since they have been using it.

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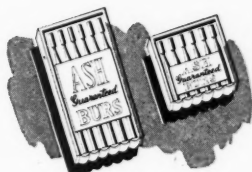
Ames Co., The W. V-B .....	570
Ash Sons & Co., Inc., Claudius .....	3rd Cover
Austenal Laboratories, Inc. ....	572-73
Bosworth Co., Harry J. ....	573
Bristol-Myers Co. ....	529
Castle Co., Wilmot .....	574
Columbus Dental Mfg. Co. ....	536
Cook-Waite Laboratories, Inc. ....	531
Dental Perfection Co. ....	532
Dentists' Supply Co., The ..	4th Cover
Hygienic Dental Mfg. Co. ....	570
Interstate Dental Co. ....	571
Justi & Son, Inc., H. D. ....	568-69
Luxene .....	576
Ney Co., The J. M. ....	564-65
Pfizer & Co., Inc., Chas. ....	534
Rocky Mountain Metal Products ..	575
Smith & Son Mfg. Co., Lee S. ....	532
Ticonium .....	566
Universal Dental Co. ....	2nd Cover
White Dental Mfg. Co., The S. S. ....	533
Williams Gold Refining Co., Inc. ....	520
Wilmot Castle Co. ....	574
Young Dental Mfg. Co. ....	570



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